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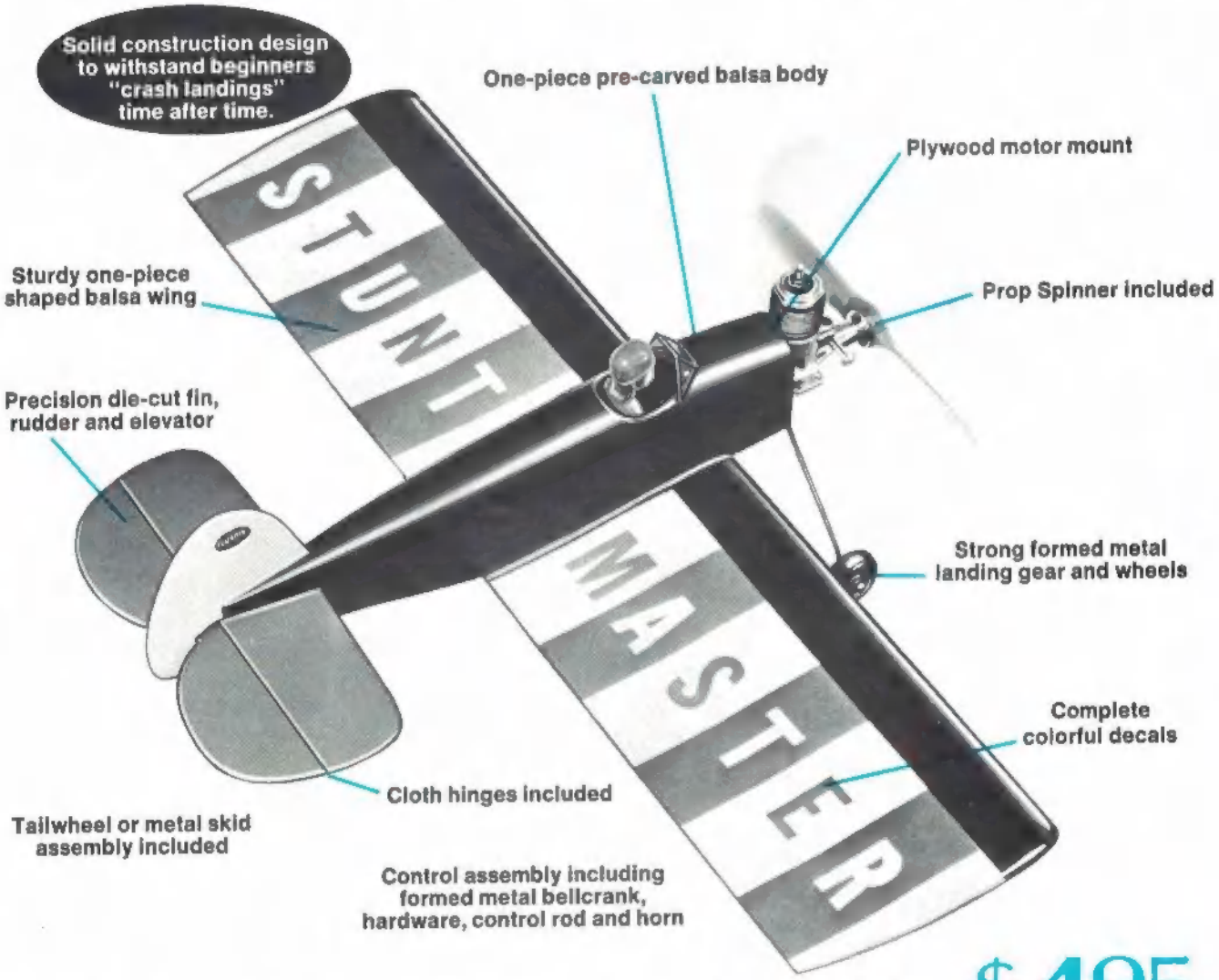

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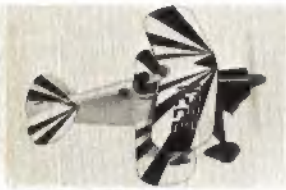

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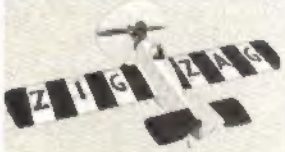

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For you contributors, there's a new and broad market for simple, interesting designs, how-to-do-it articles and picture features of all kinds. Not only that, fresh ideas are always needed for the Tenderfoot series in the parent magazine, **American Aircraft Modeler.** Although numerous letters offering help have been received, it will assist the editors in discussing things with you, if you'd list specific suggestions and, when possible, include samples of drawings and photos. For the **American Aircraft Modeler,** address editor Ed Sweeney; for the **Junior American Modeler,** address this writer. The latch-string is out.

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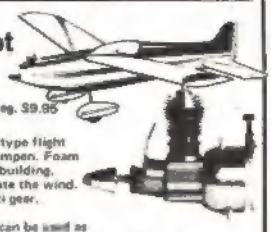

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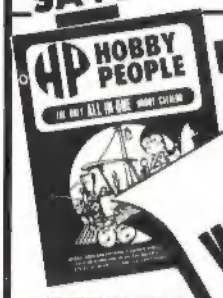

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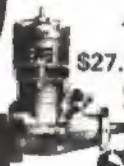

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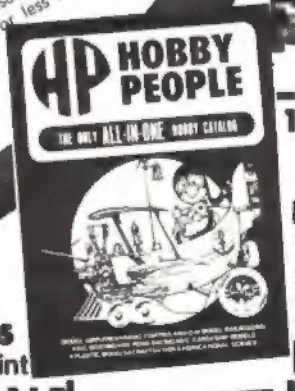

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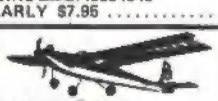

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Too simple? Kid stuff? Hardly. Designing one's own craft is, oddly enough, beyond many "experts." The simple, variated construction is a strange challenge, because present-day "complex" ships frequently call for approximately the same skills as assembling and varnishing a coffee table. Flying is not the cinch they think it is, because they may know little or nothing about the things that make a plane fly or be stable. Or they may not be able to fathom the gentle art of balancing and trim and adjustment. And how can you expect them to know the pleasant rewards of really flying just for fun?

The announcement, two issues ago, of the new **Junior American Modeler**, to be introduced November 1, has had an electrifying effect. As we said in the August issue, it would be a bi-monthly for the first year, with a cover price of 60 cents and a subscription rate of $3.00 for six issues. Everyone had talked so much for years about doing something for the youngster and the beginner of all ages, that a genuine magazine seems too good to be true. But true it is! We've been surprised and gratified that so many readers—many of whom are not kids!—ordered subscriptions before a formal offer was made. Advertisers, asking nothing of rates or details, have snapped-up covers, and even the centerspread, before a trade announcement could be made. We'll try to live up to these great expectations.

For you contributors, there's a new and broad market for simple, interesting designs, how-to-do-it articles and picture features of all kinds. Not only that, fresh ideas are always needed for the Tenderfoot series in the parent magazine, **American Aircraft Modeler.** Although numerous letters offering help have been received, it will assist the editors in discussing things with you, if you'd list specific suggestions and, when possible, include samples of drawings and photos. For the **American Aircraft Modeler,** address editor Ed Sweeney; for the **Junior American Modeler,** address this writer. The latch-string is out.

—Bill Winter.

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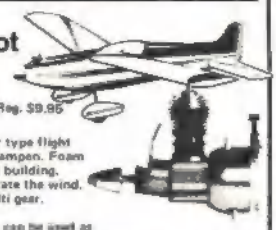

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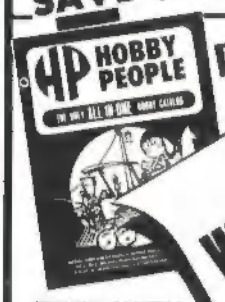

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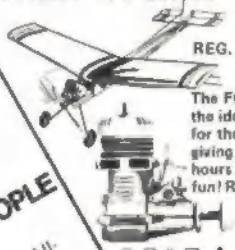

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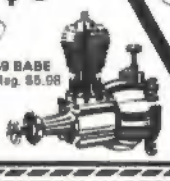

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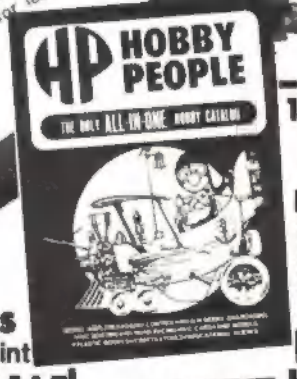

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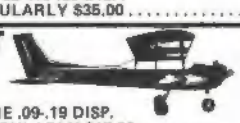

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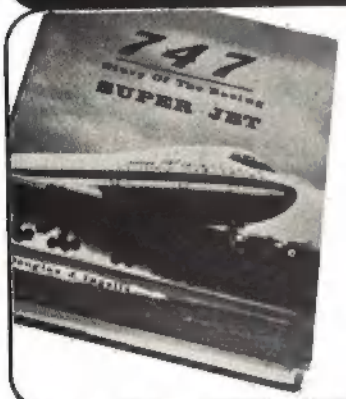

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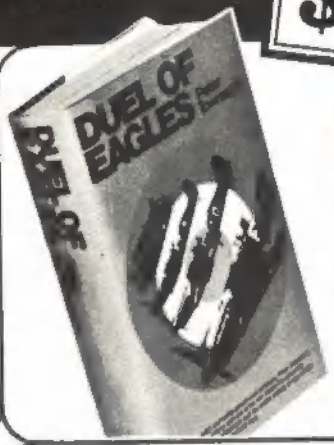

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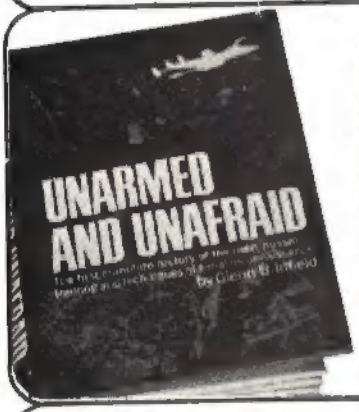

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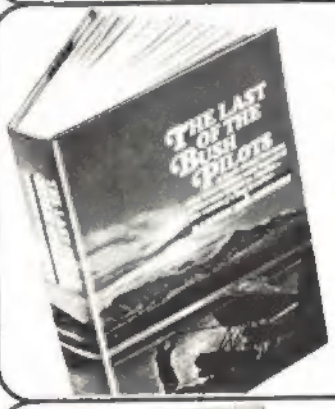

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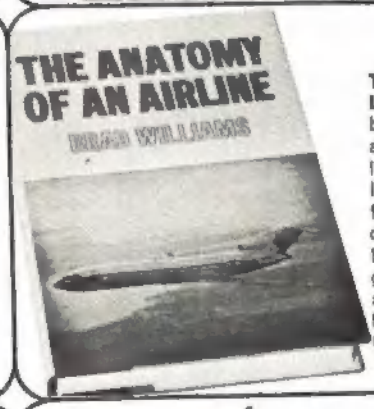

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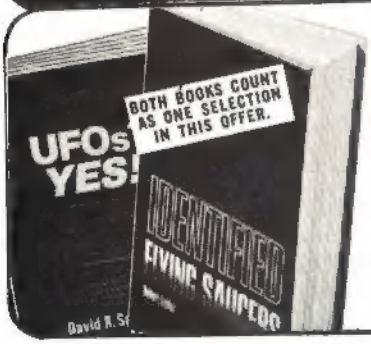

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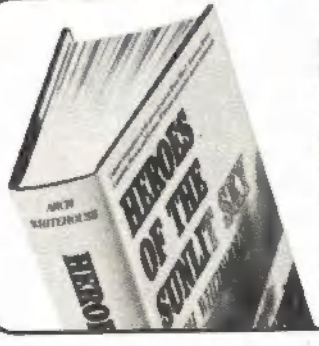

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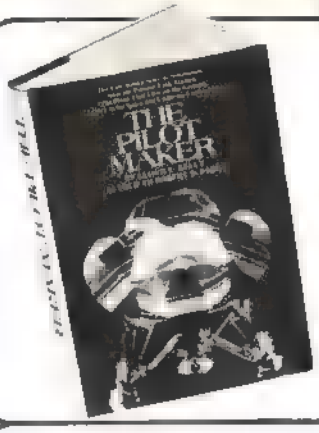

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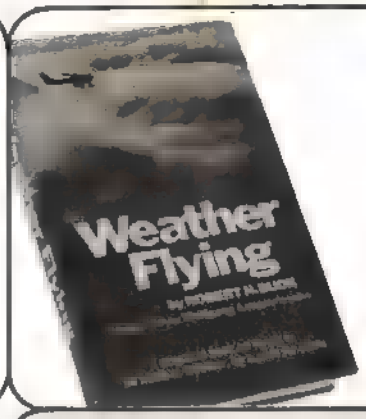

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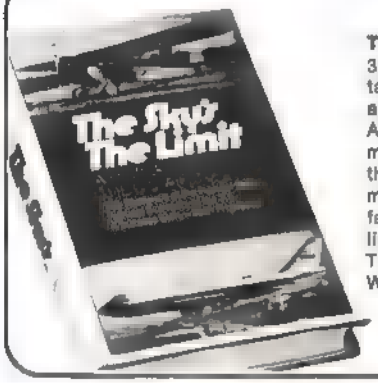

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Where it really began

I am a modeler who started building in the early thirties, when materials were kite sticks, weed stalks, bamboo slivers from dad's fishing pole, hatbox tissue paper, and LePage's glue. (We later wised up to dissolving celluloid toothbrush handles in acetone for our supply of both cement and dope.) Books from the library explained the ways of carving true-pitch propellers; all were hand-carved until the advent of gasoline engines.

Having grown up in West Lafayette, Ind., I was privileged to be at Purdue University Airport when: Wiley Post landed his Vega; Amelia Earhart became a member of the faculty; Selfridge Army Air Corps sent over a Boeing P26-A for the local airshow; and Jim Cahill was a fellow member of the Slipsticks, P.U.'s model club. Though most of my craft were self-designed and scratch-built, I did get and build the Korda winner from a kit. This was a truly great model! Also built my first gasoline-powered Zipper by Goldberg before the war–it had a Mighty Atom and was lost in space on the third flight.

Back from the war to glow plugs and control line planes; I still have four ignition engines from those days. Now retired and back at model airplane building and flying, I picked the Sr. Falcon for my first RC kit. When it was completed, Air Force Major Jim Bonar checked it out for trim and made it possible for me to solo prior to his transfer from Michigan to Oklahoma. The extent of my ability so far is to take off, make a large circle, and a rough landing–but tomorrow the world!

A Top Flite SE5A is two-thirds complete now, and hopefully will be my next hurdle. For a grand finale, I have ancient Jim Roe plans for the Sopwith Triplane which I, as a former draftsman, am scaling up to 2"-1'. This, along with plans by Bjorn Karlstrom, from W.C. Hannan, and Profile Publications No. 73, to assure authenticity of scale. I intend to put my gizzard into this model and later enter Nats RC scale events.

It has been a pleasure to share with you these reminiscences.

James Oswalt, East Tawas, Mich.

What about singles?

The ultimate goal in aircraft modeling is to build and fly the "perfect" plane. Every year many of these beautiful ships roll out of the workshop to compete in contests–in search of the plane which is truly the most perfect.

Yet, in the field of RC modeling, many of these cannot compete. Why? Not everyone can afford to put together a big model with a horse-and-a-half up front and $300 or $400 worth of equipment inside. These ships are limited to the people with money as well as skill.

What about the guy with the Golden Bee up front and $75 worth of single-channel equipment stuck inside? He certainly can't enter stunt; it's really quite hard to do a snap roll or a knife edge maneuver with single-channel.

So why doesn't AMA put together some contests for one-, two- and three-channel planes? These could be scored on the maneuvers they can do. This would open up

contest flying to a lot of people at lower cost—not a bad way to hike up AMA membership, either.

I am 13 and am just starting to get into RC after a couple of years of control line scale and a little free flight. I'd like to compete in some contests without ripping apart my bank account.

John Seed, Los Angeles, Calif.

Ukie conversion

I would like to comment on a letter from a Ukie fan which appeared in your June issue. John McKenna was unhappy that there are so few Ukie designs around. He seems to blame the manufacturers, so I would like to add something in their defense.

In the same issue—on the very next page, in fact—was a Sterling Models ad which described over 60 U-control model kits. Also in the same magazine was the Kayeff ad which offered perhaps a dozen more—all excellent Ukie projects. In addition, of course, are the Ukie designs offered by Carl Goldberg, Top Flite and a number of others.

If this isn't enough, perhaps this fellow Ukie fan might like to try what I do. I enjoy converting RC jobs and using a Roberts 3-line system. I couple the rudder to the throttle on the third line so that more rudder is added on reduced throttle settings to keep lines taut. These RC jobs fly like real airplanes and are a lot of fun on long lines with a good 60 in the nose.

This writer also suggested that AAM has deemphasized UC—a point to which I also take exception. Yours is definitely the best magazine for U-Controllers and, again, the proof was in the same issue where you provided drawings of two excellent semi-scale stunters.

As a Ukie fan who has been in this hobby for 35 years, I felt I had to say something. I certainly do not feel that we are being discriminated against.

Earl VanGorder, Albany, N.Y.

Still climbing. . .

Thank you for the editorial column on Jim Walker (July 1971, AAM). It probably didn't do much for the new fliers, but it sure brought back memories to this tired old man.

Jim really was one of the all time greats; he did a lot for all of us. I can remember reading about Jim years ago in one of the mags. It told about him flying on fish line and showed a sketch of the bellcrank setup. I had to try one—used an old Quaker Flash wing with tips cut off, trike gear with 3 1/2" Trexler wheels and a Brown D. Didn't know they were not supposed to glide, so ended up with around 1/2 under wing LE. With this, the thing sorta' had a staggering glide. My superior brain told me that more up than down control was needed.

On the first flight, the model took off smooth and slow, started climbing; I gave it a little down, it continued climbing. More down—still climbing. . . all the down—still climbing. Picked up the pieces and went home. Didn't try again for several years and never did learn to fly yo-yo real well.

There are still a few giants left in this hobby: Carl Goldberg is still coming up with great stuff. I consider him to be the all-time greatest as a designer.

Glen Spickler, Bakersfield, Calif.

ON THE SCENE

(Continued on page 97)

A TV SESSION WITH THE PGRC CLUB

WRC-TV of Washington, D. C., an NBC affiliate station, presents a unique Sunday afternoon program called "Three Hundred Sixty." It is a program showing the world around us, and has covered such subjects as airport baggage handling, bees and honey production and the President's physical fitness program.

The field activities of the Prince Georges Radio Control Club were recently filmed to be aired on this show. Ernie Fields, co-host of the weekly program, and an active RC'er in the PGRC Club, casually mentioned his hobby to his producer, Jim Silman, several months ago. With the assistance of the Club and Pat Murphy as its spokesman, Ernie presented a script on the Club for a "Three Hundred Sixty" program. The editor of AAM was invited to attend the filming session.

The purpose of the show was to further the public understanding of aircraft modeling in general, and RC in particular. Needless to say, the Club welcomed the publicity and benefits to modeling. Over 50 planes and as many active PGRC modelers turned out on Wednesday, July 7, to provide background and atmosphere for the filming. The Club flying site is an old grass WW II training field, now owned by the Maryland Parks and Planning Commission and made available to the PGRC as a flying field–a very large one for the East Coast.

About 2500 feet of film was taken at the field in addition to studio shots. The program is a half-hour show; it took 11½ hours to complete the filming, so one can assume there is much leftover film. All this overshoot will be made available to the Club for its use later on. It is probable that the program footage and some of the overshoot will be edited for AMA's use as model aviation publicity.

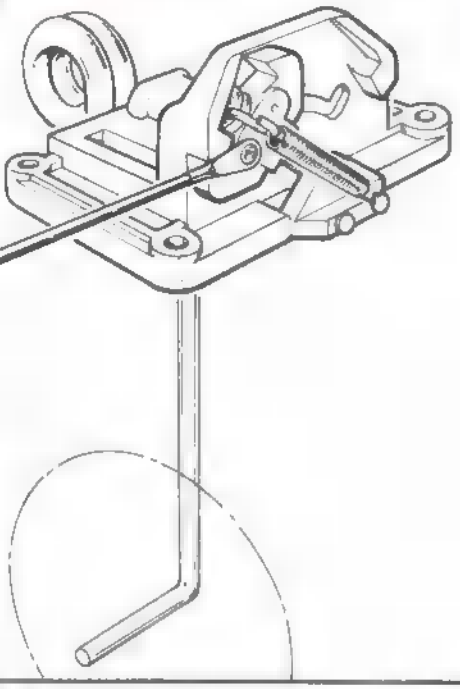
Having seen this film crew in action, I can highly recommend any footage they have taken. They successfully coordinated the real model airplane sounds with the film and could accurately follow models in flight. This crew was invited to come film the RC Internats if possible, due to their expertise at the PGRC field. The cameraman was Joe Neil; George Light was program director.

The prewritten script for the program began with Ernie Fields' wild gyrations with a Pilot Cardinal ARF. The show's hostess, Gwen Thompson, introduced Ernie and the PGRC Club. A former Washington, D. C. disc jockey, Ernie is a genuine comic as well as a skilled RC pilot. He showed Gwen how to fly. Some film footage shows Gwen holding the RC transmitter with Ernie in the typical instructor's position–bear hugging her in order to hold the control sticks.

Ernie then flew the Cardinal, as a rank beginner would fly; the gyrations of the ARF model were quite realistic. This filming sequence ended with a not-so-planned crash. The remaining footage included interviews of club members and their precision flying in action. Not only power planes were demonstrated, but also gliders and pit scenes. Several fabulous scale ships were flown, too. Bernie Murphy brought along his DR-1, and the Hibbard family flew their Proctor Nieuport and Antic.

This TV filming of a typical RC club's flying activity is probably not the first time it has been done. It does illustrate that the public is genuinely interested in what we are doing. "Three Hundred Sixty" is televised locally, but the film is available nationally. Your club, wherever you are, should consider seeking similar exposure for its activities. Be prepared to work for it and to work really hard with the studio to give them what they want to film. In this PGRC show, the producer stuck firmly with his script–as a club, you must be also prepared to do the same.

CARL GOLDBERG



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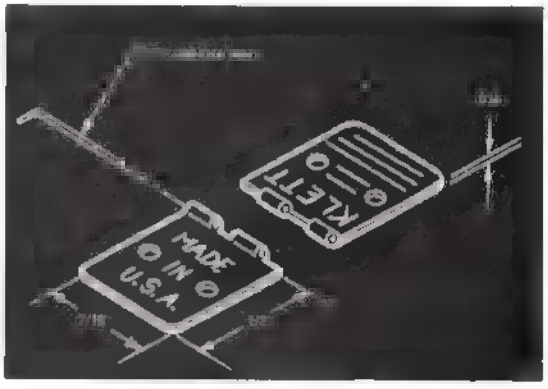
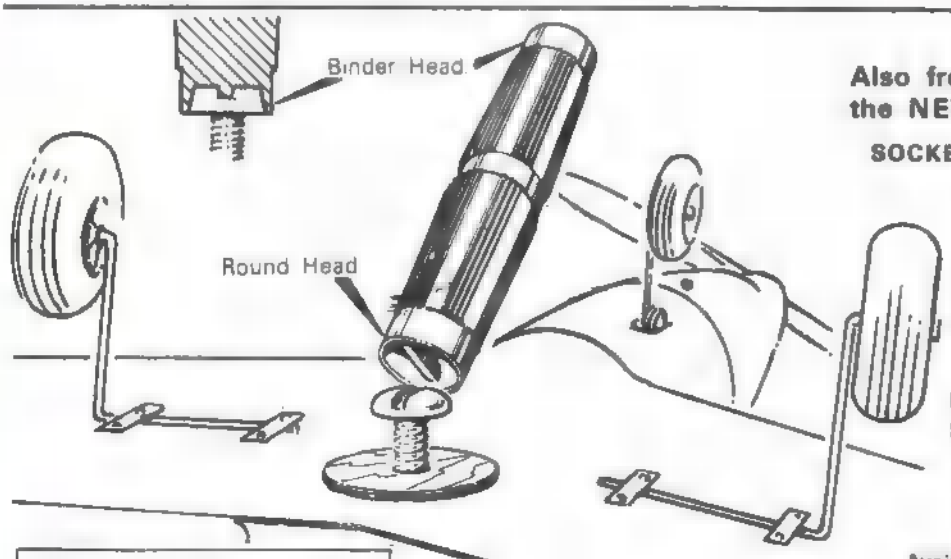
When the RK Hinges were first introduced several years ago, they were instantly accepted by modelers everywhere as the answer for smooth operation of control surfaces. Very shortly they were copied by manufacturers in the U.S. and in other parts of the world. The quality, however, has never been equaled because of the exceptional care and attention to detail by the designer, Roy Klett. Now, he has designed and is manufacturing his new RK2 Hinges which are smaller and extremely strong — and so thin that all you need is a knife slit for them. Note the dimensions, especially the thickness. These hinges are the absolute top quality, yet the price is only $1.95 for 15, and $1.10 for 7. Exclusively marketed by Carl Goldberg Models.





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AAM visits the "Annapolis of the Air" in Pensacola, Florida and takes a cruise aboard the carrier USS Lexington.

3 Days with the US Navy

On his way up. ■ student tries the ejection seat. Pulling on the rings above his helmet triggers the seat and protects his head.

■ demonstration of ditching by parachute, inflating raft, and getting in. Most important is to save the parachute pack—it carries survival gear.

Looking forward along the angled landing deck. Arresting cables in foreground.

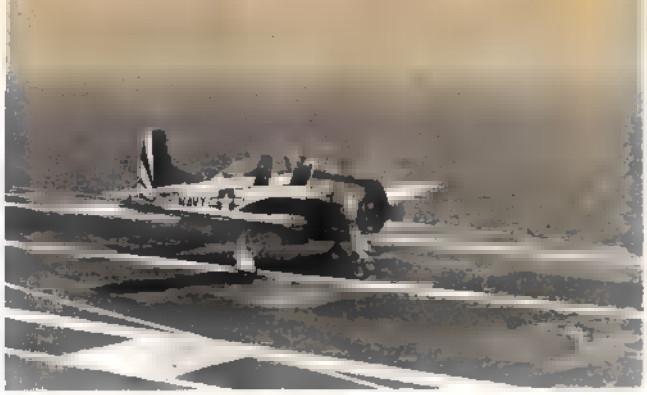
Because the catapults were inoperative, the T-2 Buckeye jets made only touch and goes. They are exciting too. Here is the whole sequence of a perfect touch and go. These were the very first approaches and landings on the carrier for this group of pilots.

On the second, third and fourth of June this year the editor of this magazine enjoyed a "Civilian Orientation Cruise" with the U.S. Naval Air Training Command. The guests invited on this cruise were primarily publishers, editors, and news media representatives of the major magazines and TV and radio stations in the country. Our hosts on this cruise were Vice Admiral Bernard M. Strean, Chief of Naval Air Training and Rear Admiral John M. Thomas, Chief of Naval Air Basic Training.

The Navy wanted to show us what programs a Naval Air Officer accomplishes in his training and to meet as many officers-in-training as possible during the cruise. Without question, it was a remarkable experience—every moment was exciting. It was quite interesting for me to meet the other guests; to attend the equivalent of the post-National Model Airplane Championships, H.I.A.A. Cruise (I have always wanted to go, but never have been able to) and see the fabulous Pensacola Naval Air Station operations.

The trip began with our departure Wednesday morning from Andrews AFB, Maryland, aboard a Navy C-118 (remember the DC-6?). Upon arrival in Pensacola a few hours later, we began our tour with the Naval Aerospace Medical Institute, the Coriolis Platform, disorientation device, and Baker, the monkey which took the first trip through space. Next, we visited the low-pressure chamber where a flier is trained to recognize the symptoms of high-altitude flight medical phenomena.

We were shown the Dilbert Dunker, a cockpit simulator used to train pilots in getting out of aircraft downed at sea. The Land Survival Exhibit showed us nonharmful as well as poisonous snakes and how to prepare for eating herbs, weeds, and the like found anywhere in the world. We were



This T-28 has made a perfect touch and [illegible] on the angled deck.

After a "trap" (arrested landing) the plane is lined up on the straight deck for takeoff. No catapult needed for these.

The Pensacola Museum shows the entire history of Naval Aviation. Many fascinating full-size planes are on display.

The friend. During all carrier flights, a safety copter stays airborne nearby. Its pilot is also a student.

by ED SWEENEY

convinced that there is always food available when you know what to select. That evening we were guests, along with several U.S. Navy Waves (pretty, too!) and many Naval Air Officers in training, at a fish fry at the Barrancas Beach House.

Our second day was entirely spent on board the USS Lexington, the Navy's only full-time training aircraft carrier. It seemed so huge until the Navy told us the USS Enterprise is very much larger. The Lexington, home for 1400 men, operates out of Pensacola and Corpus Christi. Both Naval and Marine Corps aviators make their first carrier qualification landings on her decks in both the prop-driven T-28 Trojan and the twin-jet T-2 Buckeye.

My photos tell the story of the cruise fairly well. Essentially, we were there to see the first landing and takeoffs from the deck by about twenty aviators. Having seen the same aircraft operate from a runway, the Lexington deck seemed the size of a postage stamp. Back on shore that evening, all enjoyed a steak banquet and pageant—a display of all the U.S. flags and uniforms since before the American Revolution, shown as the National Anthem of each respective period was played. It was a moving patriotic show.

The third day began with a trip to the Aviation Memorial Chapel and then on to the parade grounds to observe the graduation ceremonies of the Naval Aviation Schools Command. Following the parade, we went to the Naval Aviation Museum which is seen in the photos. Pictures of the displays of every type of Naval aircraft were impossible to get, as everything from the earliest biplane to modern jet was shown in two-ft. span model size.

The return home to Andrews was again by the venerable C-118.

One of the most interesting displays is this old float-equipped bipe—bare frame on one side, covered on the other. One of Pensacola's first trainers.

This is the moment of graduation for [illegible] group of officers. They have completed the training, earned their wings, and [illegible] successful carrier landings. Now they go on to advanced training before joining the fleet.

FAIMAN

by BOB STALICK

Here's a winner for FAI Power events with no gadgets—just simple old-fashioned lines.

Quick and simple to build, easy to trim and fly, this model is an excellent choice for that first step into FAI Power competition. All of the lines, except the airfoils, pylon and surface tips, are straight, with most wood being of standard size—no splicing necessary. One small set of templates will do the job for all ribs as there is no wing taper. Flight trimming is a cinch. The original was safely handling full power on its third flight.

The FAIMan was designed to be competitive in the FAI power category,—one of the backbones of free flight competition. The design came about when my dependable four-year-old power model, George Albright's High Society, began to come apart due to the stress of hundreds of flights. Although I liked its climb, I was never impressed with its glide. I felt that using the successful leading edge shape and airfoil Bob Cherny uses on his Orbiteer on a high aspect ratio wing would give me a fast climb and a good glide. My hunch paid off in both cases. The High Society tail moment was stretched out a bit and the stab percentage was left close to the original—all contributing to improved power handling as well as glide.

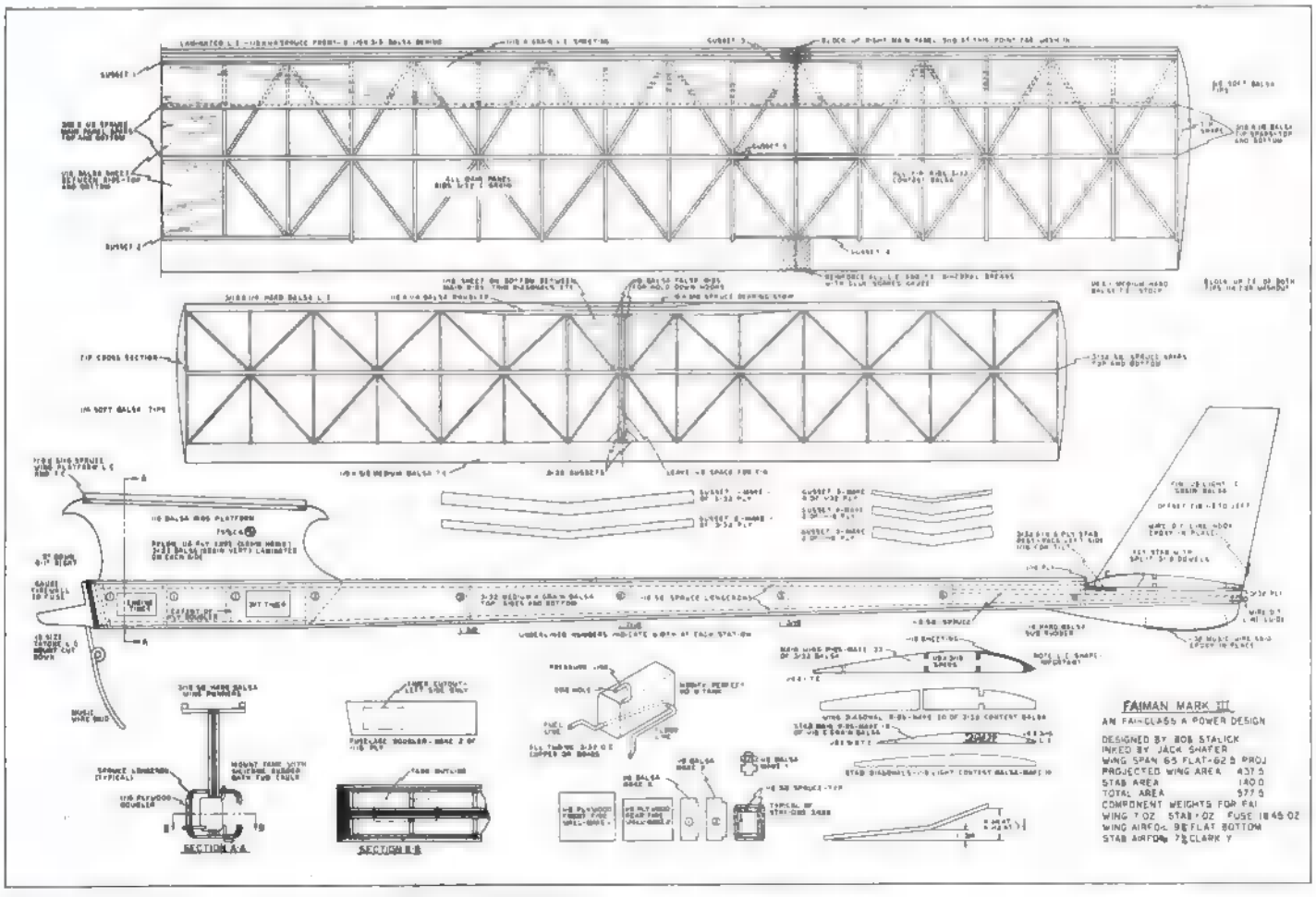
The FAIMan exceeded all of my hopes and somewhat pessimistic dreams. It competed well during the 1968 contest season, winning numerous firsts in local competition, including the annual Northwest Free Flight Championships. It also flew its way into the FAI Semi-Finals in 1969, where I had the misfortune of getting in the way of the 18,000 rpm whirling propeller and was washed out of the competition.

Construction

The wing and stab are straightforward in construction. Notch the trailing edges, pin to plan; laminate the leading edges, as shown in plan, and pin into place. Using Titebond, glue in all straight ribs (except for dihedral break ribs).

Block up the wing tips 1/4-in. under the trailing edge, to give the necessary washout. When the wing sections are dry, glue in the top spars. Allow to dry thoroughly, lift from plan and glue in the tip dihedral. When constructing the right main wing panel, be certain that the leading edge has been blocked up 1/4-in. at the polyhedral break for necessary wash-in. After tip sections are glued onto the main panels, glue the two main panels together, blocking up as indicated on

(Continued on page 78)



FULL SIZE PLANS AVAILABLE—SEE PAGE 70

Peregrine

Special-purpose racing and aerobatic slope soarer with foam wings and built-up-then-glassed fuselage. Aileron and elevator controls.

by BOB ANDRIS

The Peregrine–Mk.I is a real thoroughbred slope and aerobatic sailplane. It was the fastest of the 45 ships entered in the Fourth Annual RC Bees Glider Pylon Races held April 11th and 12th at Sunset Beach State Park, Watsonville, California. In the finals, everyone flew three four-plane heats, mixing up the 22-odd qualifiers. The Peregrine had three straight wins, with the nearest competitors having only one win apiece.

The competition in the last race was against a twelve-ft. Nelson KA-6, ten-ft. Fliteglas Schweizer 2-32, and a ten-ft.-plus Francis Cirrus–the final test! I got off to my typical conservative start; when all three were almost half-way down the course, I was just crossing the starting line. The Peregrine was the first ship to make the far turn and was in the lead from then on. When the smoke cleared after two days of heated racing, the Peregrine was on top of the heap, winning the coveted perpetual trophy.

This model has been through 90 degree vertical-bank turns, axial rolls, loops, inverted flight and a few others I'm still working on names for!

Design Philosophy

Designed primarily with RC sailplane pylon racing in mind, two main objectives of the design were to be used to judge its performance. First and foremost, was raw air speed superiority. Second, in order to negotiate a closed-course for five laps, a high degree of maneuverability was mandatory. The natural result from achieving the second objective would be good aerobatic performance. These design objectives were attacked one at a time, beginning with the air speed.

The most important part of a sailplane–the part that actually makes it fly–is the wing. It was designed first, and the fuselage tail group was then configured to get the most out of it. A laminar flow wing-section was calculated, which would have both a good L/D and yet exhibit a wide drag bucket. Under actual racing conditions, the airfoil should have excellent ground covering ability, yet, since a good portion of its flight time is spent climbing, diving and turning, there is need for a wide drag bucket to prevent the ship from slowing down too much in those maneuvers. After selecting the airfoil, the next step was to optimize the wing span for closed-course racing; then, having chosen a wing span, the aspect ratio was optimized for it.

The smaller ships, in the four- to six-ft. class, exhibited excellent maneuverability in actual racing competition, but couldn't match the ten and twelve footers in raw air speed. Calculations were then made to determine if an eight-ft. ship could match the bigger ones in air speed, if it was optimized for racing. (Flying aerobatic sailplanes had already shown me that maneuverability would not be a problem if large ailerons were employed.)

Diving out of a pylon turn, Peregrine heads down the straight at 60 mph, depending on lift.

If this were the case, the eight-ft. span would be acceptable for two additional reasons. First, the need for a one-piece wing that would give the high degree of ruggedness necessary for the pounding given by mid-airs and rough landings, and that would still be easy to transport. Second, the availability of four-ft. wood which would allow simplified and inexpensive construction.

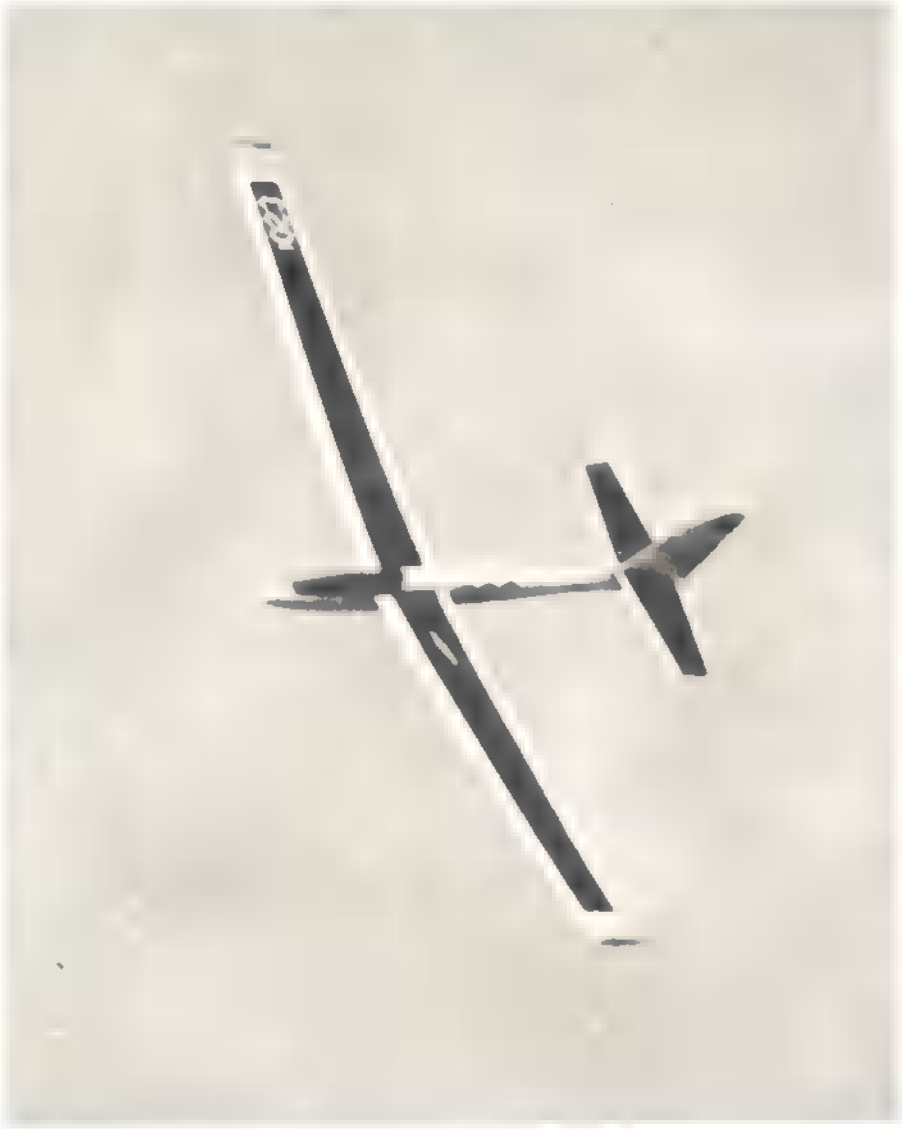
Needing the fastest sailplanes as a norm to judge air speed against, the twelve-ft. Nelson KA-6, the ten-ft. Fliteglas Schweizer, and the ten-ft. Francis Cirrus were selected. The calculations showed that if the eight-ft. span was chosen and the aspect ratio optimized, it would be superior to the others by a wide margin. The optimization then indicated that an aspect ratio of 12 should be chosen, with the all-up weight ranging from under three to over five lbs. (depending upon lift conditions). The next step was to design a fuselage and tail group around this wing.

Since the major consideration was to be speed and not scale appearance, the fuselage was designed to be no larger than that necessary to house the radio equipment and separate the wing from the tail. The frontal-area was to be minimal; yet able to present an efficient shape to the airflow.

The other prerequisite, for both a good racing and aerobatic sailplane, is maneuverability. It had been observed that ailerons were mandatory for tight turns and, of course, aerobatics simply could not be performed smoothly without them. By flying a rudder-elevator-ailerons aerobatic sailplane, it was discovered that in turning, ailerons and elevators were definitely effective enough so

Hi-Pro

All-purpose thermal or slope soarer, depending on airfoil, with commercially available glass fuselage. Hi or lo stab location. Rudder and elevator controls.



[redacted] version rounds turn in the mist high over the lowlands of Washington State.

by HARLEY MICHAELIS

What's your RC soaring bag—high aspect ratio thermal hunters, winch, hi-start, power assist? Or is it slope soarers, racers, aerobatic, or just sport? Where do you like wings placed—low, mid, shoulder? Why not design your own highly professional, highly proficient bird? With a set of designing rules and the stock "Hi-Pro" fiberglass fuse that lends itself to these numerous configurations and objectives, you can produce a winner that reflects your own taste, touch and talent—your Custom Hi-Pro.

Fuselage length, accomodating any current gear, is 42" and soarers of nice appearance from about six- to ten-ft. span may be built around it. Cross sections are nicely rounded, but sides are subtly flat so panels can still butt directly to them without need for shoulders. With a plywood post attached to the stab fin rear, you can hang on a wide assortment of tails—low, full-flying, T-tails, V-tails, and swept tails. With interchangeable plug-in panels for wing and stab, you [redacted] ready for different conditions. One moment you have a bomb for the slope, and the next a super-sensitive thermal machine—let your imagination be your guide!

Plans details a rugged racer for work in stiff winds from 15 knots and up. Speed and maneuverability were the only objectives and well-achieved. Without good head wind, hand glides were extremely difficult. Stability was much better than expected, permitting extended hands-off flight and mild stalling characteristics, in spite of sharp leading edge on the near symmetrical airfoil used. Of course, for thermal work, sections such as the Eppler 385, NACA 6409, 6412, etc., can be used. The old standby flat-bottomed Clark Y sketched on plans has given me much thermal pleasure. Recently I took the NACA 6412, made the bottom flat and got a great thermal airfoil which I recommend highly.

If you have the photographic equipment or an amateur photographer friend who does, an accurate set of airfoil templates for tapered panels are quite easy to come by. Make a good-sized drawing of the airfoil you want to use and photograph it with a lens that gives a big image on the negative. Measure chord in millimeters at all rib stations. Make a series of prints on paper strips (double weight paper) that correspond to chord, using a ruler with millimeter scale on the easel to adjust the image to size. When dry, cut out templates and use as guide in cutting the balsa ribs. Reference marks for LE, TE, spar positions, etc., may be put on the master pattern and will be in the same relative position on each smaller pattern.

Here is a set of "rules" for designing your own ship, with the Hi-Pro fuse as a constant. These rules came from successful personal designs—the Duo-Flex, Tri-Belle, Fliteglas Miskeet, Dumas Mod-Pod, all published designs. This set of ten rules upholds some simple aerodynamic laws, and unless they have been repealed lately, they should work for you, too. Do some sketching and work up a real eye-catcher. Dazzle your friends with your original creation!

(1) Choose an airfoil suited to your purpose and, by studying how it has been balanced on other models, determine its apparent best CG location—1/3 back on Clark Y, 45 percent back on 6412, etc.

(2) Spot this CG on the fuselage profile so it's about twice as far to the end of the ship as it is to the tip of the nose.

(3) On constant taper wings, make root chord about 1/6 of ship's overall length and taper so tip is 40 to 60 percent of root chord, as pleases your eye.

(4) Make span 1½ (Mod-Pod) to 2½ (Miskeet) times overall length. Smaller spans and aspect ratios are best at the slope, faster and more maneuverable. For multi-purpose ships AR's 12 to 15/1 are good—up to 20/1 on good thermal ship.

(5) On other wing platforms, part constant chord with tapered tip section, make root about 1/7 overall length to yield similar areas as in No. 3.

(6) Make stab area 15 to 20 percent of wing area—less on larger ships. Reduced areas bring nose up; just lose a stab half in flight and see. Very little movable elevator is needed for normal flight correction—more for aerobatics.

(7) Make vertical tail combined area about 6½ to 7½ percent of that of wing. Make moving area 50 percent or better, especially on slope ships—less is needed on T-tails (perhaps 1/3).

(8) On slope designs, little or no incidence

Peregrine

that the rudder could be completely eliminated.

With these as ground rules, the aileron servo was mounted in the wing and the fuselage designed only to house the battery pack, receiver, and elevator servo. In the interest of minimizing drag and obtaining smooth airflow, a butterfly-tail was employed. This allowed removal of one tail surface and also provided fewer tail-fuselage intersections.

Construction

The construction of this model is simple, strong and quick. Starting with the fuselage, cut out two matching fuselage sides from 48" long 1/8" balsa. Take 1/2 x 1/2" triangle-stock and trim the two sharp corners until it is 3/8 x 3/8". Glue these in place for the upper rear longerons and the full-length lower longerons. Add the 1/32" ply reinforcements to the fuselage sides fore and aft of the wing saddle, and install 1/8" balsa doublers at the wing saddle. Glue the 1/4 x 1/4" triangle-stock braces at the three bulkhead locations; then install the 1/8 x 1/4" upper longerons from the nose to the leading edge of the wing saddle.

Glue the 1/8 x 3/16" truss-braces in place from the nose all the way back to the tail. Laminate a 1/32" ply-3/16" balsa-1/32" ply sandwich, keeping the plywood grain direction vertical and the balsa grain horizontal. After the sandwich has dried, cut out all three bulkheads. Fix the two large bulkheads in place, fore and aft of the wing saddle, on one of the fuselage sides. After that has dried, glue the other fuselage side onto the two bulkheads.

When dry, pull the two halves together at the nose and glue the nose bulkhead in place. Taper the lower trailing edge longerons at the tail; pull the two sides together at the trail and glue. Install 1/8 x 3/16" truss-braces aft of wing saddle on the top, and along the entire bottom of the fuselage.

Add 1/8" balsa sheeting along the bottom of the fuselage, and on the top of the fuselage aft of the wing saddle. Glue 1/4 x 1/4" triangle-stock behind the top of the nose bulkhead and at the rear end of the hatch location.

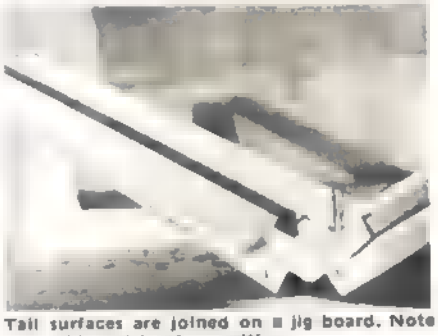
Forward of the wing saddle, install 1/4" balsa top and spot-glue the 1/4" balsa hatch in place. Add the balsa nose block, and install 3/32" ply facings at the leading and trailing edges of the wing saddle area.

The fuselage is almost complete except for sanding and installation of the wing fillets. Sand the fuselage as round as possible, except at the wing saddle and stab locations. At the wing saddle, install 1/2 x 1/2" triangle stock wing fillets and sand ■ that they fair in with the fuselage.

The fuselage is now ready to be fiberglassed for additional strength and then painted; or to be MonoKoted for a lightweight finish.

The tail group is built like a standard foam wing, that is, a foam core with balsa leading and trailing edges, and balsa sheeting covering the top and bottom. Using 3/32" plywood, cut out and number the stab root and tip templates. To prevent snagging the hot wire, sand the edges very smooth. Using the hot wire, shape the foam block ■ that the proper amount (1 1/2") of sweep back will be obtained.

Author and his trophy. To be effective, the plane has long, wide, powerful ailerons.



Tail surfaces are joined on ■ jig board. Note control horn/elevator position.

Finished and sanded balsa fuselage is glassed for durability.

■ing center section joined and glassed. Torque rods drive the ailerons.

Cut left and right side stab cores and then sand them smooth. Using a contact cement, such as Coregrip, sheet the top of each stab half. Turn the cores upside down and place on a flat building board. Glue 1/8" balsa in place at the trailing edge with Titebond and pin securely to the building board. After drying overnight, sand the trailing edge to match the airfoil contour.

Sheet the bottoms of the stab halves, again using contact cement on the foam and Titebond on the tailing edge. Pin or clamp to the board and allow to dry overnight. Titebond on 1/4" balsa leading edges and tape in place securely. When dry, sand each half to the proper airfoil shape. Cut each half, on the elevator hinge line, and separate the elevators from the stab. Bevel the leading edge of the elevators and install 1/16" balsa facings to cover the exposed portions of the foam core.

Insert a small piece of hard balsa in each elevator and drill a 1/16" hole to accept the elevator torque rods which are fabricated from 1/16" music wire. Solder 3/32" brass tubing to the wires, crimp flat on the end and drill holes for the clevises, using 3/32" aluminum tubing as the bearings. Epoxy the torque rods to the stab halves and reinstall the small portion of the stab that was cut off with the elevators.

Sand the proper amount of dihedral into each stab half, block them in place and epoxy the halves together. Reinforce the center section (top and bottom) with a 1 1/2"-wide strip of 1 oz. fiberglass cloth, using epoxy or resin. The stab is now ready to be fiberglassed (using 1 oz. cloth) for additional strength or to be MonoKoted for a lightweight finish.

The elevators should also be fiberglassed or MonoKoted. If MonoKote is used for covering, install the elevators on the stab using epoxy to secure the torque rods to the elevators and MonoKote for the hinges. If fiberglass is used, install the elevators after the model has been painted. Glue the stab to fuselage and add a soft balsa fairing to blend in with the fuselage.

The wing is built much the same as the stab, except on a bigger scale. In order to make construction easier, each wing half is made up of two foam cores, contact-cemented to each other at the mid-span point of each wing half. The additional portions of the wing that are not similar to the stab follow.

After joining the finished halves with epoxy, install a 1/16" ply-lined servo-well at the center (in the bottom of the wing). Install a spruce insert at the trailing edge of the wing at the center section. This is to provide additional strength in the area where the rubber bands cross the wing.

The center section is reinforced with three overlapping layers of 1 oz. fiberglass cloth (for additional strength). Install balsa blocks and ply facings at the leading and trailing edges and sand so as to fair in with the fuselage.

The final step in finishing the wing is to install 3/32" ply tip plates. As with the stab, the wing may be fiberglassed with 1 oz. cloth for additional strength or MonoKoted for

(Continued on page 71)

Hi-Pro

might be used if elevator control is involved, but on thermal ships set wing for 2½ to 3 degrees to slow down. Stab can be 0-0, but of course, is easily trimmed when all-moving.

(9) Work for 3 to 5 degrees airborne dihedral, remembering those skinnier wings will flex.

(10) On panels with tapered element, twist tips downward, starting about 3/4 out from root. A four-in. tip should have 1/4" to 3/8" twist (washout).

Construction

Fuselage: Smooth any irregularities where halves meet and join in good alignment with masking tape placed externally across and along seam line. Lay fiberglass tape along bottom seam. Use an acid brush on dowel handle to reach back inside. Use fiberglass resin only to join, avoiding excess which adds weight. Let this cure and then seam top. Extra cloth can be laid up where wings butt, and also around canopy opening, nose, etc., to strengthen. Smooth imperfections with epoxy putty and wet sanding.

Canopy: Place oversize clear canopy (comes with fiberglass fuse, $19.95 postpaid from Dumas Products, Inc.) over fuse opening, holding tight with masking tape placed across. Then outline opening with masking tape. Remove and trim off excess. Fit base to opening, recessed thickness of canopy material. Paint up base, attach name plate, and secure canopy with contact cement or epoxy. Remove any excess to fit opening nicely. To keep fuse from spreading under canopy, secure a ply member across fuse just forward of servos, using cloth and resin. Receiver may slip under this base.

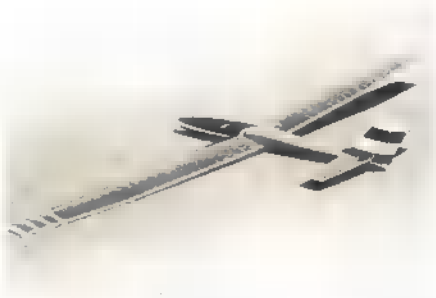
Wing support systems: Plans detail use of various sizes of fiberglass rods in the Micro-Flite brand by Browning Arms Co. which are the source of the Crawford shafts commonly found at RC shops. No. 4, as thru fuse, is most commonly-found size in stock, about 9/32" OD. No. 4's slip easily into No. 10's (check your archery outlets for these, No. 5's, and the tempered aluminum tube that may be used for reinforcing the No. 4's).

Wing construction: The plans incorporate some changes deemed wise after much wringing out of the original racing Hi-Pro and won't correspond strictly to photos. Span was chopped to reduce flex in tight turns and increase speed. The fiberglass rods will bear up when balsa members fail. My original 55" MonoKoted panels weighed only 8 oz. each. For high stress applications, the fiberglass rods as spars have considerable merit.

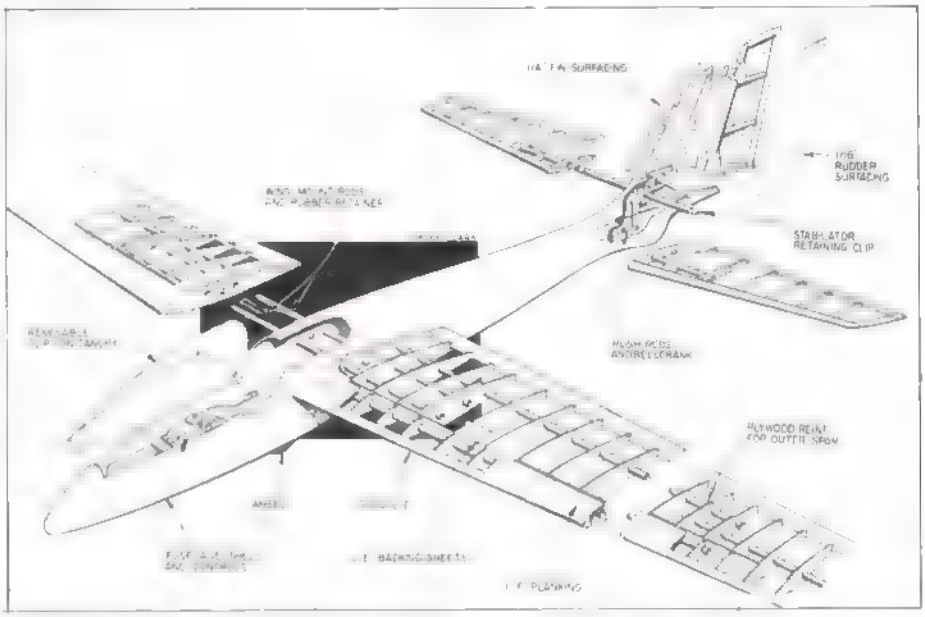
A Hi-Pro rod set can be directly ordered from Martin Archery Co., Rt. 5, Box 127, Walla Walla, Wash. Send them $6.50 for postpaid set of rods, including one tempered aluminum, to build wing as plans show. A No. 0 rod, ¼" OD (nice for pushrods) are 50 cents each with above order. Holes are cut with tool depicted on plans, which has a bit of common pin centered in it. In the photographic airfoil template process, the master rib is marked with a pair of X's that represent hole centerlines. Punch through template with pin into balsa, then press cutter and turn to cut.

Stab: The supporting No. 4 is fixed, and the clips, set in the ends, allow the stab to

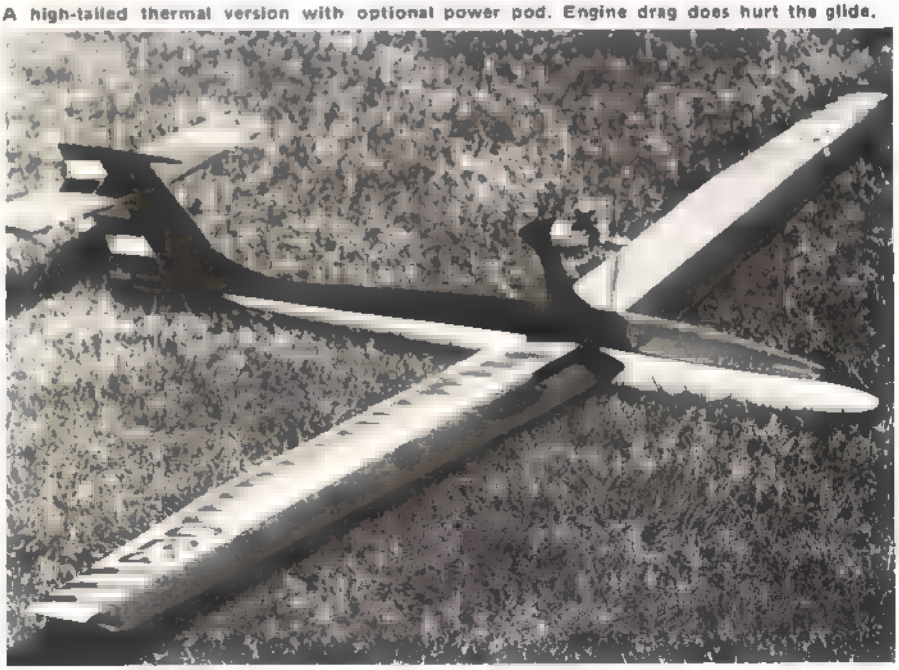
(Continued on page 66)



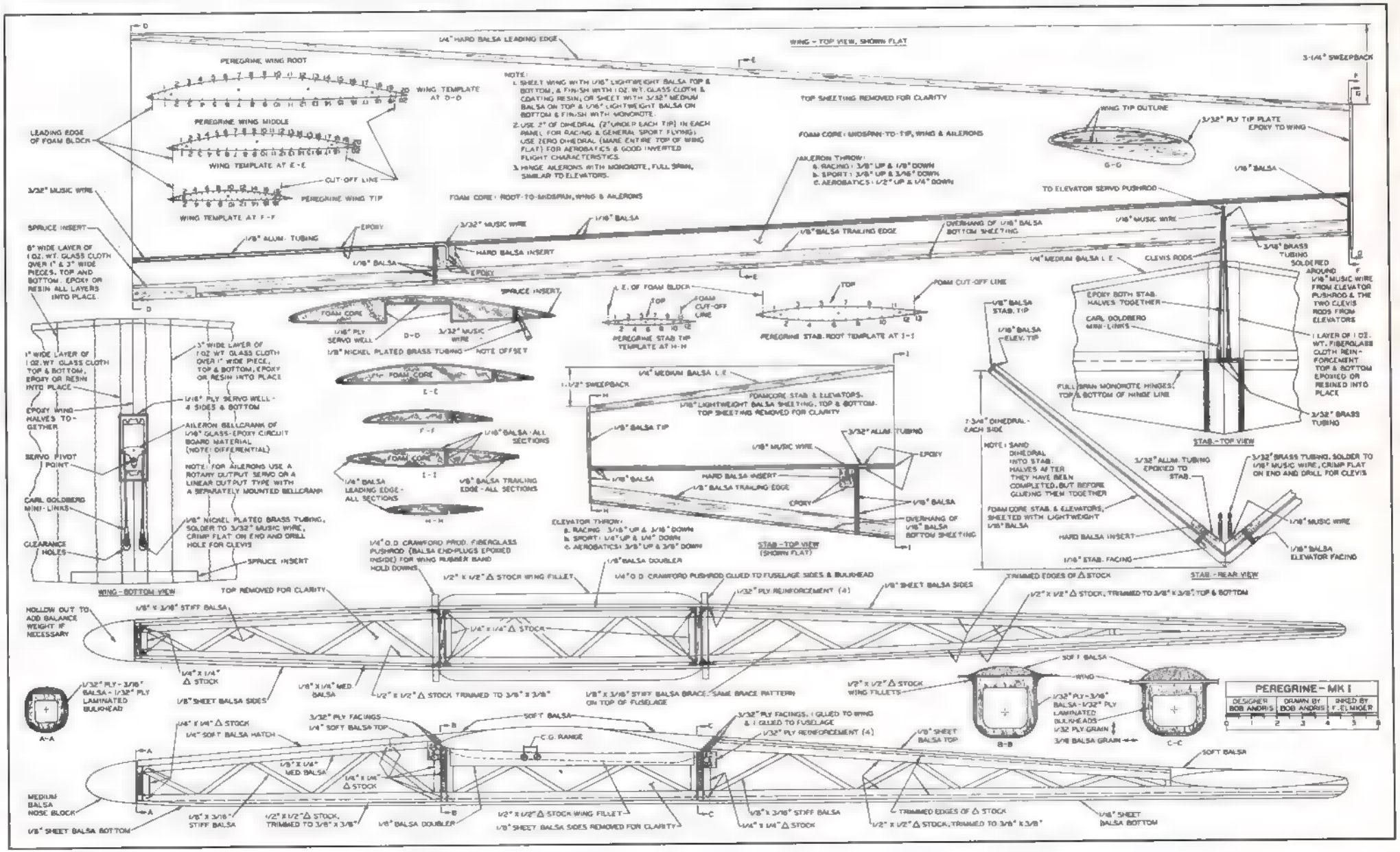
For thermals, a bit more dihedral and a larger rudder help. Empty weight is 1½ lb.

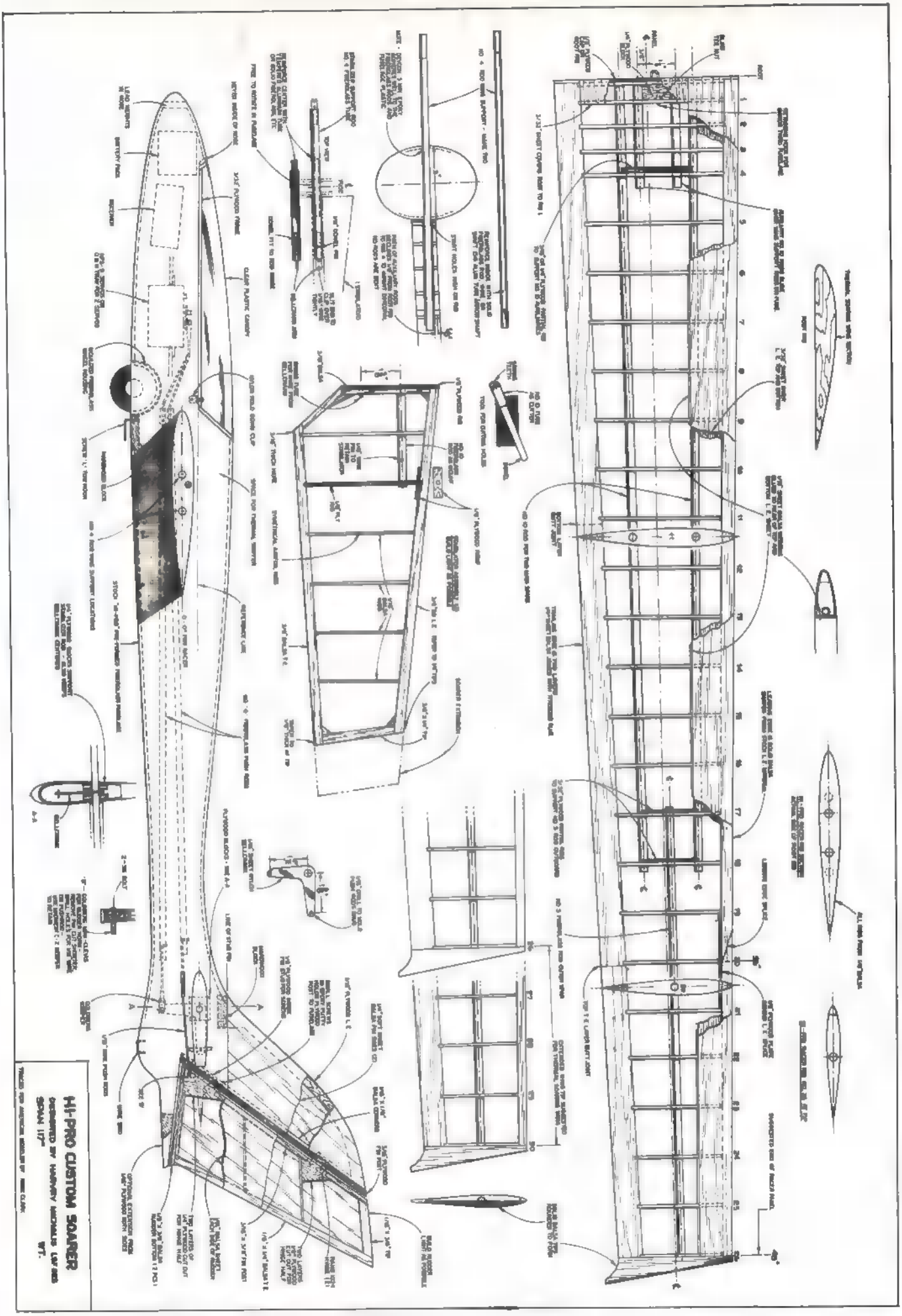


A high-tailed thermal version with optional power pod. Engine drag does hurt the glide.



FULL SIZE PLANS AVAILABLE—SEE PAGE 70

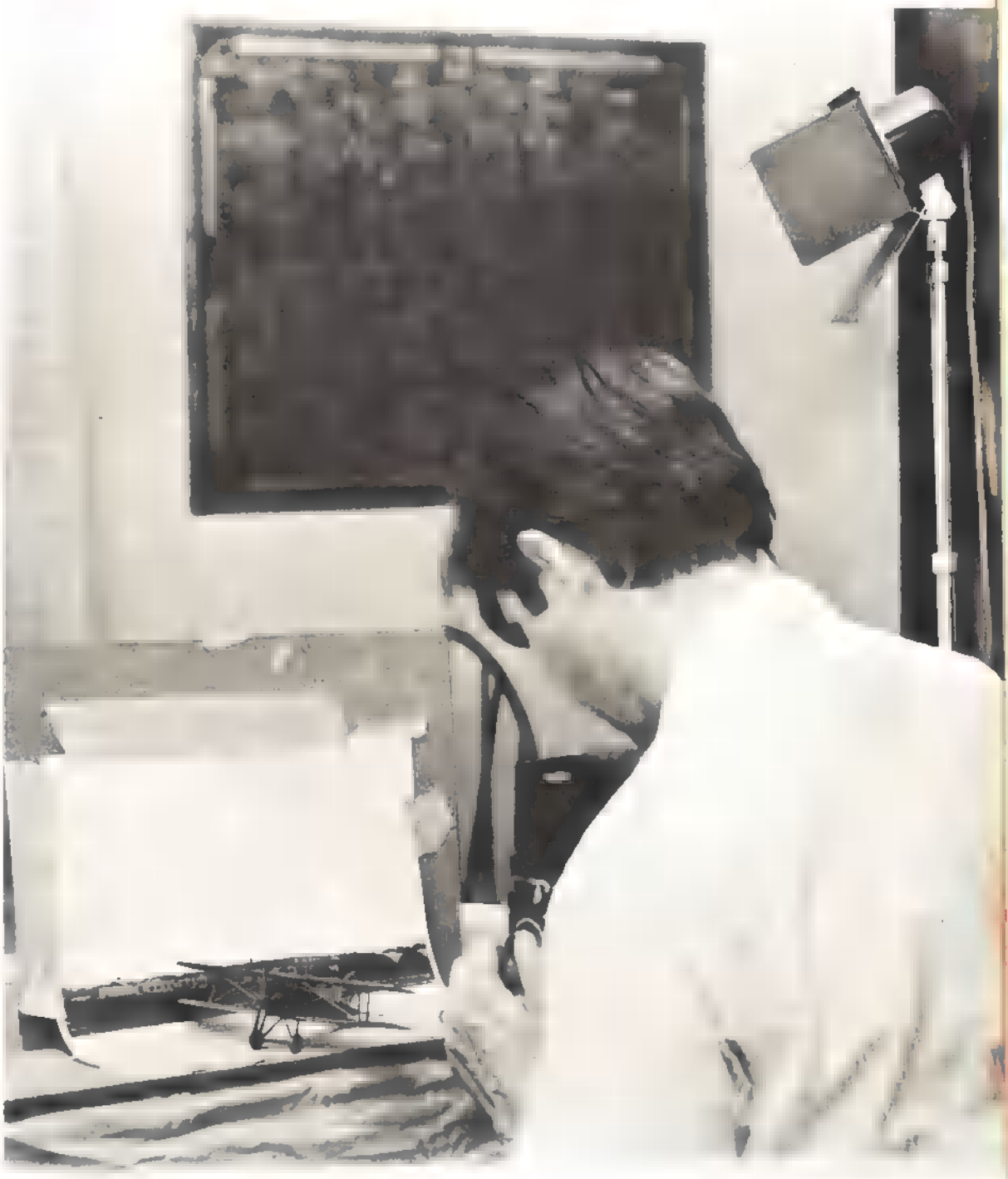




FULL SIZE PLANS AVAILABLE—SEE PAGE 70

Photographing your model

by FRANK PIERCE



Tabletop setup used in making scale photograph. 500-watt lamp reflects light from foil reflector (left) for even lighting. Camera is positioned about 10 ft. from model. Distance may vary from lens to lens.

Deserted flying field of old Erco plant in Riverdale Md., provided site with open runway, factory buildings in background.

MAKING A REALISTIC PHOTOGRAPH of a scale model is frequently more difficult than building the model in the first place. Something is lost, so that when the finished photo is compared to a picture of the full-scale prototype, the essential "full-scale" look so carefully built into the model is missing.

This phenomenon puzzled me for years. By looking carefully at model and full-scale photos side by side, I have come to the following conclusions.

(1) Perspective. Perspective is the converging of straight lines in a picture which give the viewer some idea of relative size and depth. The larger the object, the more the parallel lines appear to converge. In a full-scale aircraft, the convergence of parallel lines (the leading and trailing edges of an untapered wing, for example) is quite apparent with the types of camera lenses normally used by most photographers. Conversely, there is virtually no convergence of parallel lines in the photograph of a 1/72 scale model, and practically none in all but the largest models. This lack of convergence, or perspective, is the first indication that the photo is of a model, even though the viewer may not realize it.

(2) Camera angle. One of the most frequent mistakes is that of positioning the camera at an angle which could be achieved only by a buzzard with a knack for photography. Most photographs of full-scale aircraft are made with a camera held at waist- or eye-level—about four to six feet above ground level. On a flat-surfaced field, this drops the horizon to approximately the level of the horizontal stabilizers. Unless the plane is parked in front of a rather tall building, the aircraft nose will be silhouetted against the sky and little, if any, runway will be clearly visible behind the aircraft. Tall grass, yes, but not concrete at this low angle.

(3) Background. Most obviously, real planes don't sit suspended on a milk-white seamless background or on a maple-grained table top. To create the illusion of reality, a realistic background is a must.

The builder does not need to be a photographic wizard to make a realistic photo of his best scale model. Any good 35-mm camera and ten dollars are more than enough to put him in business. If he is lucky enough to have a good twin-lens reflex or even an old press or view camera, he can get the same results.

Approach systematically each of the three

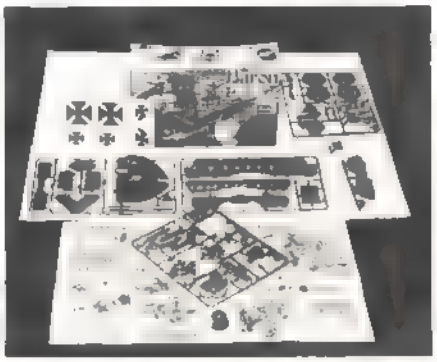
(Continued on page 66)

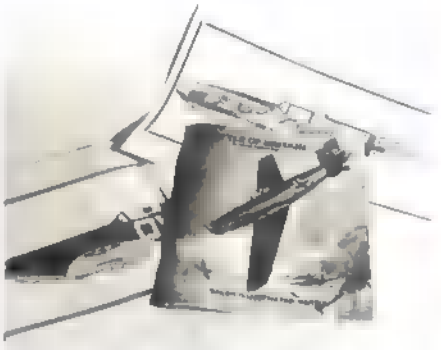
Scale photograph (1/2 sec. at f22) has camera positioned low, about waist high to a viewer of the actual aircraft. Wide-angle effect of close-up lens attachment enhances perspective for scale effect.

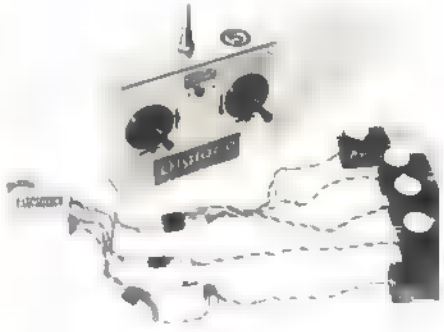
Model photographed in conventional way using normal lens. Note apparent smallness of plane, particularly smallness of elevators compared to wing. Angle would be difficult if not impossible to obtain photographing actual aircraft.

Another realistically photographed 1/72 scale plastic model suggesting a winter scene.

new products check list







Robart Mfg./Teflon shoe. New super-shoe is constructed of cast aluminum with heavy coating of Teflon for super-smooth bonding of thermal-sensitive model coverings. Sharp edge and smooth rounded edge allow easy access to hard-to-reach crevices and corners. Easily mounted directly to old iron. $2.98. Robart Manufacturing Co., Box 122, Wheaton, Ill. 60187

Caler Publications/The Battle of Britain. Fifty pages of detailed information on English-German engagements over Britain from June through October, 1940. Ample photographs and source data from both sides, data on squadron deployments, casualties, etc. make this a valuable addition to air historian's library. Two full-color prints included. $3.95. John W. Caler Publications Corp., 7506 Clybourn Ave., Sun Valley, Calif. 91352

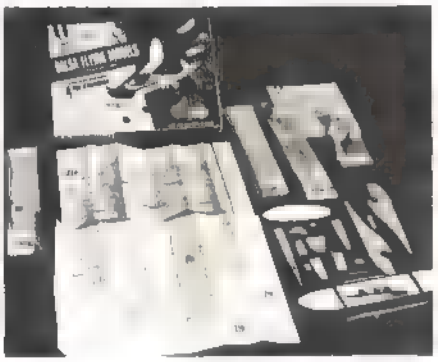
Revell/Five-winged Funfdecker. Like nuddink effer zeen in der skies, Der Red Baron in scalekittenform. Hotroddenstyle Fokker Funfdecker mit five vings und der Chrysler Hemi engine! Lodts chrome, insignia, but der zement nicht included, Dumbkoff. Aboudt ten Marks or $2.25. Revell Inc., 4287 Glencoe Ave., Venice, Calif. 90291

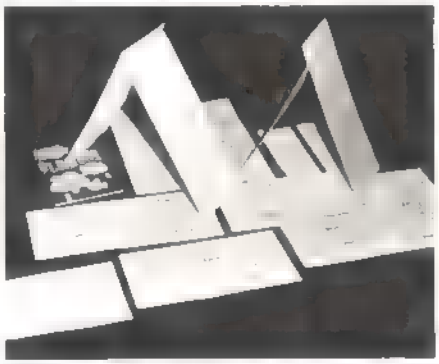
Dumas/Li'l Tiger. Deluxe profile U-control kit — solid balsa fuselage, wings, stab, rudder and built-up cowl. Eye-catching design, 14" span, flies on .049 power. Full colorful decals and hardware included. $4.50.

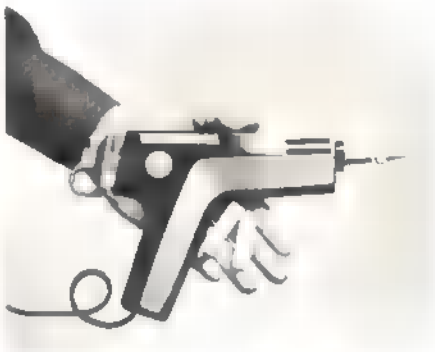
Dumas Sk-Daddle 20F. Beautifully finished fiberglass hull in a variety of candy-flake colors, ready for engine, radio, and control hardware. White bottom, green, gold, red, or blue deck color, decals and all marine hardware. $49.95. Dumas, Box 6093, Tucson, Ariz. 85716

Rand Sales/Digiace 4-channel RC. Small, lightweight 4-channel system combines quality and low price. Digital operation, 3-stage transmitter has high RF output. Silicon circuitry used in receiver, has double-tuned RF stage and automatic gain control. Complete airborne weight, 13 oz. $169; with NiCads and charger, $219. Rand Sales, Box 20059, Columbus, Ohio 43220

by FRANK PIERCE







Midwest Products/Beginner's kit. Attractively packaged, Craft-air kit provides beginner with four complete flying models in separate stages of increasing complexity. Everything included—glue, sandpaper, wheels, even straight pins. Old-favorite designs include two simple gliders, ROG, and classic rubber-powered cabin plane (shown). Quality balsa and die-cutting throughout. Midwest Products, 400 S. Indiana, Hobart, Ind. 46342

Lanier Industries/Colt F-45. Vacuum-formed pre-colored fuselage, styrofoam wings and stabilizer with aeroskin covering, plus hardwood aft fuselage stiffener for extra ruggedness. 55" span, under five lb. with 45 power, under six lb. with 60 power. 550 sq. in. wing surface. Fully aerobatic, flies all AMA and FAI patterns. Complete spare parts list available. $54.95. Lanier Industries, Inc., Briarwood [redacted]., Oakwood, Ga. 30566

Eldon Industries/Quickfly glider. Assembly time [redacted] astonishing 15 sec., with preformed styrofoam fuselage with integral rudder, plug-in elevator and wings. 42" span. Colorful tape trim included. Attractively packaged. $3.98. Kit 8207. Eldon Industries, Inc., Hawthorne, Calif. 90250

Lancer Industries/Floaters. Amazing ultralight gliders can be constructed from special styrofoam, 1/8th the weight of paper. Each kit provides a number of patterns with such esoteric names as Aeolus, Solace, Icarus, Kinesis. Floaters can [redacted] constructed according to your own inspiration. With styrofoam [redacted] other extras, $2.50. Lancer Industries, Box 445, Carpinteria, Calif. 93013

Sonic-Tronics/Electric fuel pump. Easy way to transfer fuel without danger of spillage. Operates [redacted] any DC source from 1.5 to 4 volts. 18" lines have self-contained fuel filter. Molded case and heavy-duty motor for long life. $9.95. Sonic-Tronics Inc., 8017 Craig St., Philadelphia, Pa. 19136

Weller/Glue Gun. New gluing tool shaped like conventional soldering gun. Uses special thermal glue which hardens with cooling rather than drying. Hot melt adhesive is billed as a high-strength bonding agent for wood, glass, plastics, fiberglass, linoleum, etc. Finished bond sets in 30 sec., dries flexible and waterproof. Extra glue sticks available. Weller 2400 Glue Gun, $10.95. Weller, 100 Wellco Rd., Easton, Pa. 18042

by DON BERLINER

Incredible HawK

It was a crash that ended an era. It was the beginning of unprecedented opportunity. It was a time of many changes. And it all began with a scheme to produce the world's fastest racing biplane—by removing its bottom wing and thus turning it into a monoplane!

The era of the big service races was coming to an end. The great series of Schneider Trophy Races actually had ended, at least as meaningful competitions, in 1929, though there would be a solo run by the Supermarine S6B to permanently retire the trophy in 1931. The Pulitzer Trophy Races for Army planes had ended in 1925, while the Curtiss Marine Trophy series had just been concluded with the May 31, 1930 event at Anacostia Naval Air Station, Washington, D.C.

Winner of that race was Marine Capt. Arthur H. Page, flying the twin float-equipped Curtiss F6C-3 Marine Hawk No. A-7147 at the record speed of 164.1 mph. Somewhat of a angular machine (similar to the Army's P-1 Hawk, except for the landing gear), it didn't look much like a racer, but it was more of one than any of its challengers.

With no more military races to give the armed services much-needed excuses for developing fast airplanes in the face of Congressional apathy, something else had to be found. And it was, quickly, in the form of the clasic Thompson Trophy, to be awarded to the winner of a free-for-all race open to any kind of airplane on hand for the Chicago National Air Races, Aug. 23-Sept. 1, 1930. Its predecessor, the one-shot Charles W. Thompson Trophy, had been presented in 1929 to Doug Davis for whipping the military's best with his Travel Air Mystery S.

Davis' speed of 194.9 mph was far beyond the capability of the Marine Hawk, with its box-like cowling and huge pontoons, but enough people were convinced of the Hawk's potential to warrant going ahead with one of the most extensive programs of modifications ever undertaken. Serious planning began less than two weeks after Capt. Page had won the

The Navy's wild conversion of ■ biplane fighter to ■ parasol monoplane lapped the field in the 1930 Thompson, but then something went wrong....

Curtiss Marine race, with the following memo from Lt. W. S. Diehl, of the Navy's Bureau of Aeronautics, to a Commander Webster:

"Cmdr. Miles has requested that I give you a memo regarding the conversion of an F6C-3 for the National Air Races.

"Capt. Page has been in to see me several times regarding certain proposed changes. On June 11 he brought in some pencil notes obtained from the Curtiss Co. giving their estimated speed increments. Starting from 163 mph, they estimated the effects of (1) increasing power to 750 bhp; (2) changing the wing section to C-62; (3) putting on wing radiators; (4) installing new landing gear of racing type; (5) fairing fuselage, etc., would be to give 247 mph. While some of their items appeared to be high and other low, the final result looks reasonable in view of the R3C performance. It made 250 mph with 600 bhp, but since this is an 'assembled' job it should not show up quite as well. However, the proposed increase in bhp should take care of the 'assembly' defects that cannot be avoided except by ■ new design.

Estimate Submitted by Curtiss Co.

	Hours	Material
Engineering		$2,500
Landing gear	400	300
Wing radiator	1,500	50
Engine installation	300	30
Engine cowling	700	75
Engine mounting	200	12
Preparation of wings, etc.	400	200
Recovering fuselage	125	150
Piping	100	20
Propeller		425
Starter		350
Engine		7,500
Miscellaneous painting, etc.	300	100
Assembly, etc.	135	
Streamlining for fittings	100	10

"I consider that the estimate of 247 mph made by the Curtiss Co. is reasonable and that it really allows some margin."

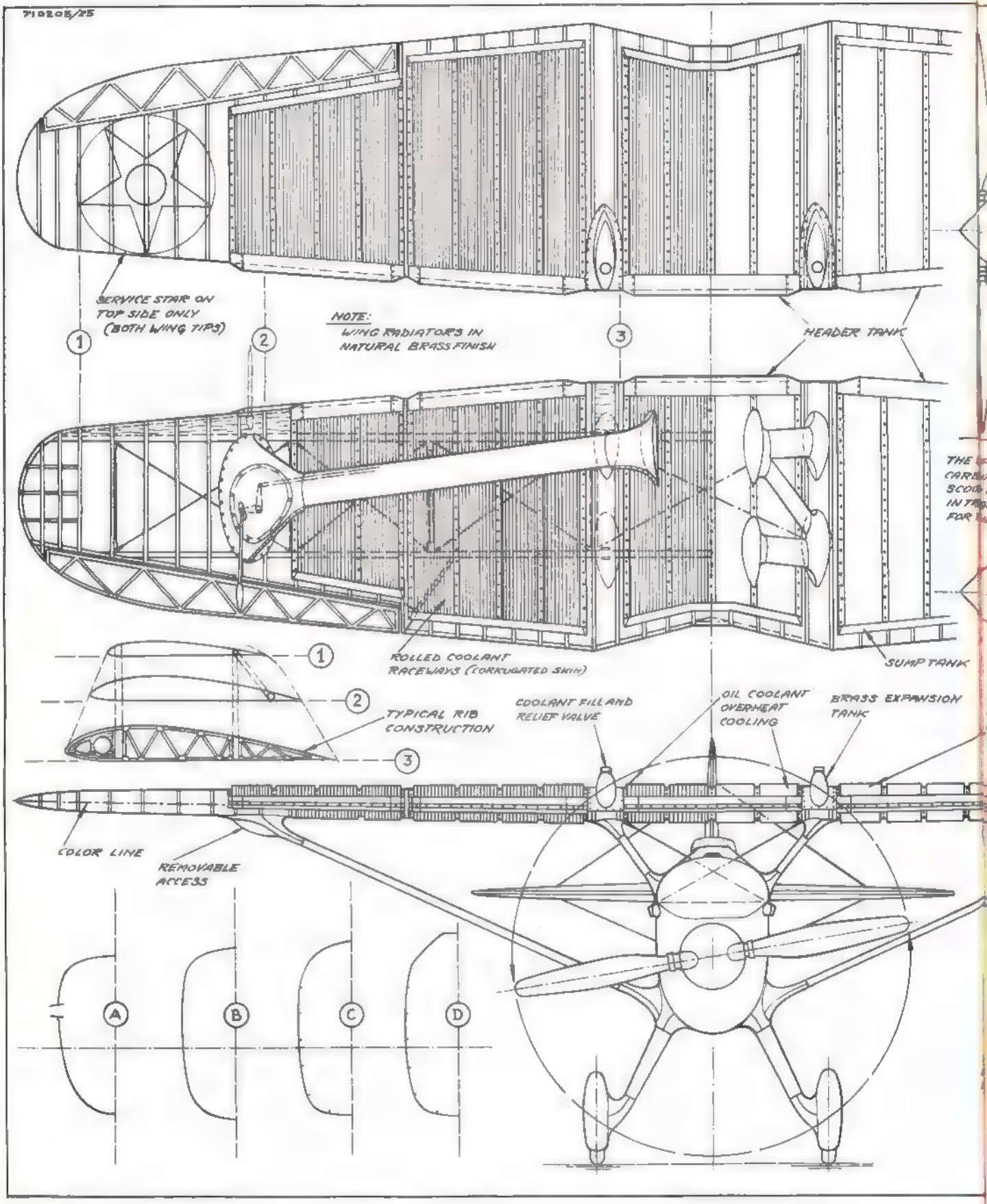
On June 13, Ted Wright, manager of the Curtiss factory at Garden City, Long Island, sent the Navy an estimate of the cost to modify the Marine Hawk.

The total cost would be $11,722 for materials, and $3,408 for labor, at the Depression Era rate of 80 cents an hour! The whole thing came to a little over $15,000, which wasn't a bad deal, if the speed actually went up as much as predicted. The original plan to replace the wings, with a set having a better airfoil than the Hawk's standard Clark Y, was dropped, even though a partially completed set of desirable wings had supposedly been located by the Air Corps at McCook Field (later Wright Field and now Wright Patterson AFB).

As originally envisioned, the big increase in speed would have come mainly from a

(Continued on page 68)

Photos by the Smithsonian Institution


SERVICE STAR ON TOP SIDE ONLY (BOTH WING TIPS)
NOTE: WING RADIATORS IN NATURAL BRASS FINISH
HEADER TANK
ROLLED COOLANT RACEWAYS (CORRUGATED SKIN)
SUMP TANK
TYPICAL RIB CONSTRUCTION
COOLANT FILL AND RELIEF VALVE
OIL COOLANT OVERHEAT COOLING
BRASS EXPANSION TANK
COLOR LINE
REMOVABLE ACCESS
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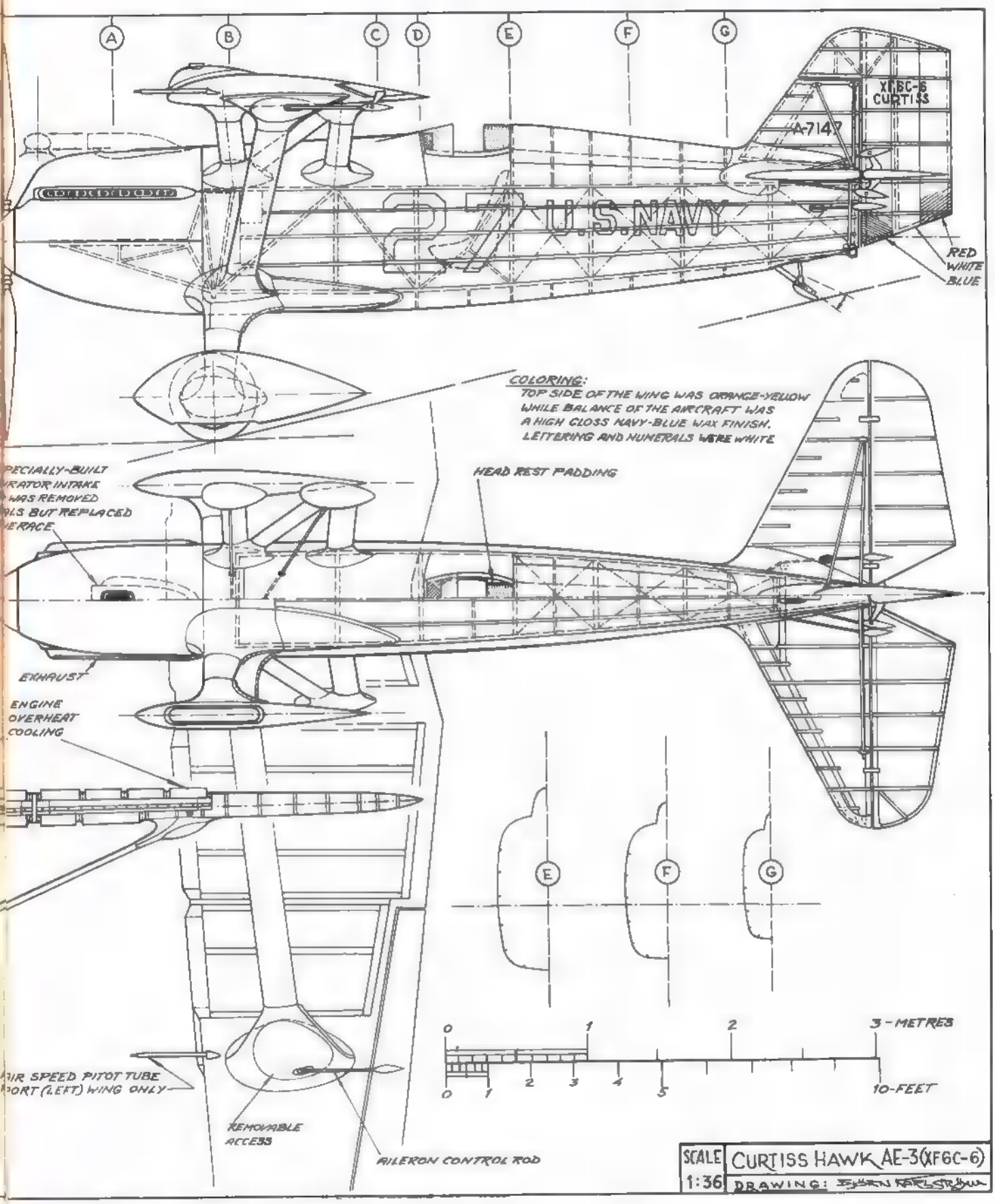
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CURTISS
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U.S.NAVY
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WHITE
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COLORING:
TOP SIDE OF THE WING WAS ORANGE-YELLOW
WHILE BALANCE OF THE AIRCRAFT WAS
A HIGH GLOSS NAVY-BLUE WAX FINISH.
LETTERING AND NUMERALS WERE WHITE
HEAD REST PADDING
EXHAUST
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OVERHEAT
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SCALE
1:36
CURTISS HAWK AE-3(XF6C-6)
DRAWING:

The Research Gambit

by BILL HANNAN

Airports are an obvious yet often overlooked place to study airplanes. Here, the author makes sketches of Slovak's Bucker Jungman. Pic by O'Hara.

"Dear Mr. Hannan, I would like to build a model of a Piper Cub, but can't find any plans." Ridiculous? Not at all. Here's another: "Dear Sir, I have just completed an exact scale model of a Lockheed P-38. Please tell me where to find a 3-view to fit it." Or, how about this one?: "Dear Sirs, As a boy I went for a ride in a very large German flying boat. It would be appreciated if you could tell me what kind it was, and where I can obtain drawings of it." While these extracts from letters may seem far-fetched, I'll wager that every model magazine editor has seen many similar ones.

It is evident that one of the biggest stumbling blocks for would-be scale modelers is basic research. Whether the area of interest is static display, free flight, control line, or RC scale, the problem is exactly the same: Where does one find reference material?

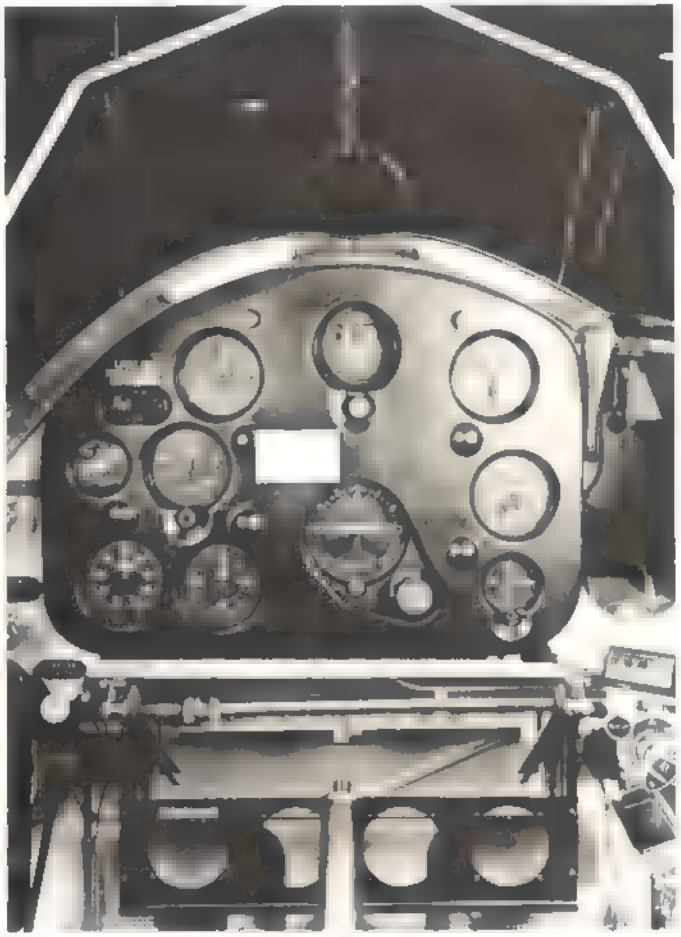
From a researcher's point of view, things have never been better. There has been a veritable "publication explosion" during recent years, covering practically all phases of aviation activity. Regardless of your favorite era, it has undoubtedly been well documented. The challenge, of course, is locating the material, and therein lies the rub. It is surprising that many modelers are willing to invest hundreds of working hours in model construction, yet are unwilling to get involved in research. Some become discouraged if they can't find the needed information from the first place they look. If you fall into that group, better forget scale models and take up basket weaving!

Research involves a great deal of effort, but it can be almost as rewarding as the actual construction of the model. Assuming that you have a "pet" machine in mind, how do you go about finding enough info to build it? If the model is being contemplated just as a fun item, the easiest approach would be to try to discover if a kit or published plan exists. If you can find one, you will be spared much of the problem-solving involved in any scale model. You may want to add a few extra "goodies," or a unique color scheme to set the model apart from the average. So you still need to do a bit of sleuthing, to be certain that your additions will be reasonably authentic. Nothing can be more discouraging than to arrive at the local flying field with your latest creation, only to be told by the first spectator that your serial numbers are obviously upside down, or that your sky-blue pink is much too green!

Those who may be thinking in terms of an all-out serious scale effort need to get much more deeply involved than the casual "fun flier," and owe it to yourselves to track down every possible piece of data available. This

Finding facts, drawings, and pictures for ■ pet scale project can be ■ major stumbling block—unless you know how and where to look.

With pilot and student peering through the windscreens, Leon Shulman's radio controlled Ryan ST gets off on maiden flight. Norm Rosenstock photo.



Instrument panel of Northrop BT-1 is fine example of detailed photography available from the National Archives. Museums are another good reference source.

may or may not be easy. If you choose ■ S.E. 5 or ■ Cessna 150, you have it made right from the start. So much material is available that your main problem will be where to store it while you are sorting the material out. On the other hand, the aforementioned subjects, while admittedly ideal from a flying standpoint, have been pretty thoroughly explored in model form, and are at the point of being rather prosaic.

To the other extreme, if you are thinking about doing a dead-accurate reproduction of, for example, a Scottish Barnwell monoplane, vintage 1911, you had better brace yourself for ■ long wait—and lots of bush-beating.

As ■ rule, most scale modelers manage to fall somewhere between these opposite poles, and our discussion of scale modeling shall be directed primarily towards them.

Consider the following reference sources: (1) Fellow model builders; (2) Libraries; (3) Book stores (both new and used); (4) Mail order houses; (5) Airports; (6) Museums; (7) Manufacturers. Usually, any one of the above will provide at least a foothold, but let's examine each possibility in greater detail.

Check among your fellow modelers, as they may have just the info you need. One of the main advantages of belonging ■ a club or organization is the fact that you can "spread the word" regarding your needs among ■ large group of people with little effort. However, some people prefer to keep their projects ■ deep, dark secret from their fellow members until they ■ spring the new creation on them in finished form ■ that big contest—but psychological hang-ups ■ outside the scope of this article.

The second most logical (and economical) place to explore is your local library. If you've forgotten how to use the card catalogs, don't hesitate to ask the librarian. Often she will be aware of reference books, oversize publications, or pamphlets on a subject that you might not find by casual browsing. Some libraries have exchange arrangements with other ones. By special request, they may be able to obtain a particular volume from another source, or even acquire ■ new one for their ■ collection, if you are willing to wait long enough.

Research is like many other facets of life—you can usually get what you want with the investment of either time or money. If "long green" is no obstacle, you will be able to obtain information quickly, but if you are a little short of cash, patience ■ probably net the same results—eventually! Many

libraries now offer low-cost copying services, which may enable you to acquire a long sought-after 3-view without having to invest in that 700 page book where it was found!

If the library tour fails to turn up your info, give some thought to visiting a few book stores. The yellow pages of the telephone book will point the way. Don't overlook the used book stores which sometimes yield a rare publication or two--often at low cost.

Mail order houses are another good place to obtain reference material, and are within reach regardless of your location. Perhaps the simplest way to locate them is by scanning the advertising pages of aviation magazines. Naturally you are a regular and dedicated reader of AAM, but we'll forgive you if you peek into a few of the other mags, too. In fact, you ought to glance through all of the aviation mags each month. You can never tell what may turn up, and you may never have a second chance at it if you pass up that choice color photo or 3-view.

Airports seem such obvious places to study airplanes, yet are frequently overlooked. Contact an airport official and obtain his cooperation in paving the way for your research efforts. One of the best ways to demonstrate your sincerity is to show them one of your models, since many aircraft owners and airport operators were or still are modelers themselves. But bear in mind that it is a privilege to be allowed close-up looks at the machines--exercise extreme caution when taking photos, etc.

Museums fall into a similar category. By all means, contact the curator in advance, and explain the purpose of your proposed visit. Chances are that he will suggest a convenient time, which will enable you to work under private conditions, rather than during regular visiting hours. You may even be allowed to get a bit closer than the general public; show your appreciation by treating the aircraft with utmost caution and respect. Incidentally, the follow-up thank you letter is too often overlooked as a sincere way of thanking people who generally receive little consideration for their efforts.

Last, but certainly not least, are the individuals and factories who build the one foot to the foot "scale models." Oddly enough, this is often not the best source for model building info. To begin with, most aircraft firms have their hands full with their own problems and can ill-afford the time to cater to some model builder's whims. Usually such a request ends up in the hands of a non-enthusiast who can scarcely be expected to regard this extra duty with pleasure! There are exceptions, of course, and these forward-looking firms are to be congratulated for their efforts and courtesy.

This is a good time to debunk the widely-held idea that a factory 3-view is to be prized above all others. Nothing could be further from the truth in most instances. Real aircraft are not manufactured from 3-views, but from hundreds (even thousands, in some cases) of individual component drawings. Thus, the factory has no real requirements for precise 3-views, and generally use the ones they may have only for reference and advertising purposes.

Suppose you try all the above suggestions, but still turn up blank in your efforts to track down that Bellanca Trimotored Racer's instrument panel photo? Well, the last resort is to advertise. Some of the enthusiast organizations offer a free "information wanted" service to their members, and there is always the classified section in this and a few other mags. In this way you can reach the largest possible audience of "fellow nuts," one of whom may have just what you are looking for tucked away in a desk drawer in his basement.

So now you know the where, but let's look into the how, of research procedure. When sending requests for information, always include a self-addressed stamped envelope! This is not only common courtesy, but also greatly increases your chances of receiving a reply. It is easy to rationalize that the big outfits can easily afford postage stamps. Perhaps, but why should they? In the case of foreign firms, museums, etc., send an International Reply Coupon, obtainable at most post offices for about 15 cents each.

Often, an inquiry will not produce direct results, but may lead to a different source, such as the address of another person. It is definitely worth following up on these clues. This phase of the research effort can be most rewarding, and will help develop a network of information sources which may prove useful on future projects.

Since some subjects may require months, or even years, of hunting, it is a good plan to research several aircraft at a time. Thus, stalled projects can be put aside until the missing links can be dredged up. If you can't wait that long, go ahead with what you have and make a "sport scale" fun thing out of it!

The Three-View Syndrome

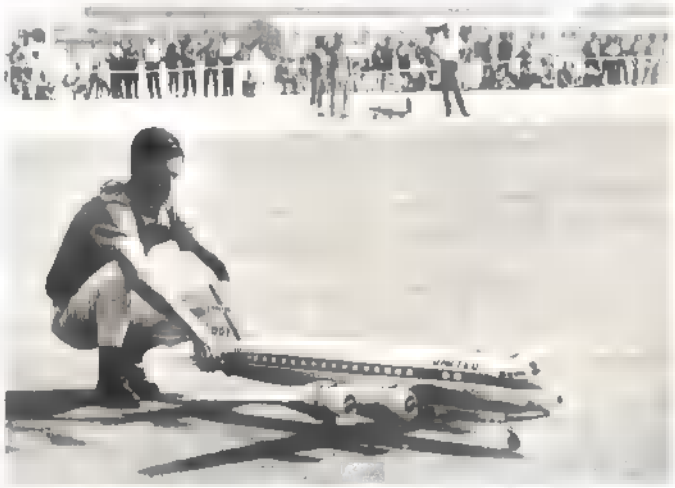
Even the best scale drawings should be regarded with apprehension. Assuming that they are completely accurate, there are certain shapes and details which simply cannot be adequately presented in 3-view form. These items are better understood with the aid of photographs, perspective drawings, or, if possible, personal inspection.

Why aren't 3-views more accurate? Before throwing rocks at the fellows who are producing them, consider the following: Have you ever tried to measure a real airplane? One must experience it for himself to fully appreciate the problems involved. No one is deliberately turning out bad drawings. Errors will inadvertently creep in of their own accord.

Perhaps one of the most misleading aspects of 3-view drawing evaluation is that some of the most detailed examples are the worst, from the standpoint of proportions and dimensional accuracy--particularly in the case of vintage drawings. Dave Freedman, a dedicated researcher, offers this explanation: "Many of these drawings were made by people with great enthusiasm but very little technical experience. Detail registers much more easily on the eye than form or shape, as may be noted in any beginner's drawing class."

Aside from the difficulties encountered in trying to measure a 3-dimensional, contoured object with ordinary measuring equipment, the owner of the machine in question might

(Continued on page 88)



Multi-engined scale craft are seen frequently in control line. Six-foot Douglas DC-7 by Phil Garrard held attention at a past Nats. Photo by Dean.

Don Typond's incredible rubber-powered Polish Wilga. The dedicated scale fan wants authenticity and details seldom found in kits, and looks far afield.

A large, heavy, 45-powered stunter
designed for those all-too-frequent windy contest days.

MARUT The Wind Spirit

by RON ADAMS

There are many trends in stunt design. One of them leans toward military jets. Scale-like details and five or six ounces of pressure-sensitive lettering are very important for gaining "impression points." Jets lend themselves to all sorts of delightful lettering, beware jet blast, cockpit emergency release, ammunition storage, etc. The Marut, big and heavy, follows my reasonably successful Navy A6A Intruder.

Looking through a series of books of three-views, I came across the new jet designed by Kurt Tank of FW 190 fame. This one was designed for the Indian Air Force with a Mach 2 capability and had the long straight lines necessary to show off the pattern maneuvers. The plane's profile really grabbed me, so I drew it up as a stunt model.

Before going into construction details, I should explain some of the reasons I design big models in the 850-sq. in. class.

A couple of years ago I worked out the design for a model based on the Navy A6A Intruder, which featured an exhaust system of magnesium tubing to feed all gases and gook out of the back of the plane. With the added weight of the exhaust tubing and a very unfortunate experience in finishing, the plane came out ■■ heavy that I was afraid to weight it. Since I could still lift it with one hand, and

it was all I had, I flew it anyway. Wonder of wonders, it flew rather well, particularly in the wind.

The first contest was the Niagara Falls Invitational held by Dave Gierke and attended by most of the top fliers in the country. I managed a third place, which did not make me at all unhappy. The next contest was the Michigan State Meet and I came in second, just a couple of points behind Jerry Worth.

Work got in the way of the rest of the season until the Nats. I went there with literally no flights in practice and ran into my first experience with loose head bolts–no start. Finally found the trouble and was so

The lines of the Marut are loosely patterned after an Indian Air Force Mach 2 fighter.

shook I left out the triangles. Second flight left me one point out of qualification. My fault, through lack of practice, and definitely not the fault of the plane.

After the season, I finally got up enough nerve to weigh the model–98 oz.! Twice the weight everyone else was used to. According to all the scuttlebutt, the thing should never have left the ground, let alone place at a major contest.

Actually, there was no real reason to have the plane weigh that much. I had built it in a week after loosing a wing. In trying to rush for the Invitational, I tried a new synthetic finish that didn't work too well. I just built up a lot of weight, trying to quickly cover the bad things happening underneath. The factors that enabled a heavy model to fly reasonably well, I believe, appear to be large size, long span, and a good disc area on the prop. Let's take a look at each item.

A basic factor in aircraft design is a dimensionless unit called the Reynold's Number. Rn equals the air density times speed times chord divided by the air's absolute viscosity. This number is used to designate changes in the character of airflow around an airfoil. In general, the higher the Rn, the more performance you can expect to get. There is a maximum limit to this, but we are a long way from supersonic in stunt.

According to the formula, we have several ways of operating at a higher, more efficient Rn. For example, we could do all our flying on a cool day in Death Valley below sea level where the air density is high. Another way is to fly faster–just as we do in a wind to get better lift and control to avoid the ground. This will hurt us in general, since most judges like to see a fairly slow pattern to give them time to write down the scores, evaluate the maneuver and take a sip of soda or whatever.

The third practical way is to increase the wing chord. This increases the Rn effectively and will let the plane fly a little better. To oversimplify the whole deal, in aircraft design, the bigger the better for efficiency. Besides, a judge is accustomed to seeing little bitty things fly by–when this monster roars by, you are sure to have his attention.

The second factor, large span, is probably the most important of the three items. In our planes we are interested in performance characteristics–smooth level flight with no tendency to hunt, and high lift capability to get us through the corners. Smooth flight is largely a function of CG location and can be adjusted by proper balancing of the plane. Lift is increased primarily by the addition of wing flaps and also by the simple expedient of increasing span. In full-size aircraft design, the rate of climb (i.e., best use of available lift) is determined almost exclusively by the span. The longer span airplane will climb better than its sister airplane, even though the two may have equal power and wing loading. Therefore, if you are going to design a large airplane, put a lot of the size into the span. The limiting factor, of course, is its transportation–it won't fit in a sports car.

The third factor mentioned is the prop's diameter; again, size helps. The bigger the diameter of the disc area, the better the turning tendency of the model. This effect is more than enough to offset any adverse gyroscopic effects (which could be minimized by using a very lightweight propeller).

We could go on and on about design features and theory, but any adequate treatment would require a series rather than a single article. Most have already been covered in much detail in model publications. I would certainly suggest the two books on design published by the Experimental Aircraft Association in Hales Corners, Wisconsin as good starting points for design considerations without becoming involved in advanced math.

In the final analysis, the acquisition of hardware on the trophy shelf is the best proof of the pudding. This size ship, and the basic design principles involved, has won in the past. The coming season will determine whether or not the Marut will come up to expectations–assuming I get some practice time on it.

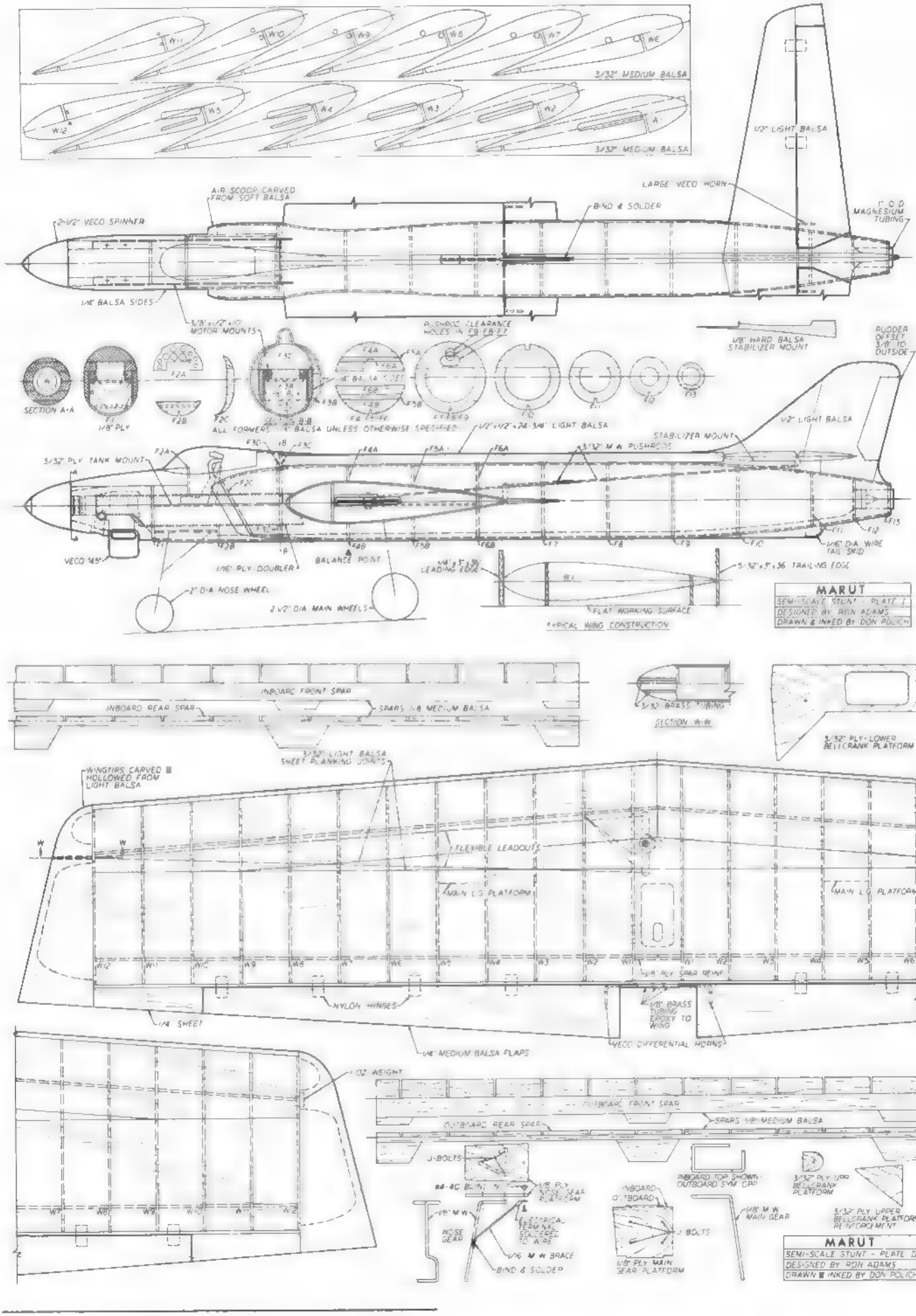
Construction

A false wing section is built first. Ribs 1 and 2 have ½-in. extensions above the rib centerline indicated on the plans. The spars also have this extension above the centerline out to the second rib notch. Cut out the half ribs and spars along with their extensions and assemble the units, extensions down, on a flat surface. Cover with 3/32" balsa just as you would the bottom center section of the actual wing. Note the taper in the panels. Sand the unit to a good surface to correspond with the final wing shape.

Next, build the engine mount section. This model is set up for a Veco 45, but the spacing on the mounts can easily be changed to fit any other engine used. However, do not try anything smaller than a 45. In fact, the plane would work even better with a larger engine. That's another nice thing about a big plane–you have room for engines and tanks.

The mounts, plywood formers, tank platform, and 1/16" doublers should be assembled as a unit ready to mate to the rest of the fuselage. Make sure they are perfectly aligned. There is no need for engine offset since the weight of the model will hold it out

(Continued on page 82)



FULL SIZE PLANS AVAILABLE—SEE PAGE 70

WHERE THE ACTION IS

RADIO CONTROL

DON LOWE
SPORT AND PATTERN

Action: This time of the year for your correspondent is frantic with completing competition craft for pattern and pylon, flying in competition, participating in local airshows, and directing the Wright Brothers Memorial R/C Championships. But the name of the game is "where the action is," and it's pure fun.

Follow Instructions: After you've been at this game awhile you get to feel that you've experienced about everything and will not repeat old mistakes nor forget old lessons learned. However, it's usually the simple mistakes that bash airplanes!

Recently, I was test-flying some new equipment in a rubber duck (plastic ARF). Horror of horrors, it glitched badly and almost bounced, but frantic waving of the transmitter antenna regained enough control to get it safely on the ground. The antenna was pressed against a servo; after relocating

After a too-hot demonstration, touch and go Jim Martin needed a gentle nose high landing. Won DC/RC's Class D Expert event.

the antenna, it flew without a hiccup. So, believe the manufacturer's instructions when he says "route the receiver antenna away from servos and wiring." Under no circumstances allow the antenna to physically touch a servo. (I will qualify the foregoing by saying that my rubber duck flew fine at one flying site with the antenna mislocated as described; but when I flew it at our own club "Glitchville USA" it would not tolerate the sin.) So give your digital gem every break by first reading and following the manufacturer's instructions, and being careful with your installation.

Instructions for Pattern Judges: Most fathers are proud of their sons and I'm no exception. Jon is now taller than I, smarter (he thinks), and is on his way to becoming a capable pattern flier. This year he is Chief Judge for

Aeromaster with Ross Twin flown in Class D Novice by Bill Hinnant. Built-up stab and rudder enhance already-good looks.

our annual contest and he prepared some thoughts that should help for better judging and may be of value to potential judges.

Judges should sit far enough apart to discourage conversing and comparing of notes; if using counters, as we do, the sound and point score of the other judge cannot be heard. After the start of the flight there should be no communication between judges, and no comparison of scores until the flight is completed. Judging is an individual impression of the execution of maneuvers. The only exception is a nod or other communication when agreeing on a mandatory zero for an unrecognizable maneuver. This can be upsetting if heard by the contestant and may cause him to blow the rest of the flight. There is nothing more disconcerting to a flier than to hear the judges talking when he is performing a maneuver. He is right in thinking the judges aren't devoting their entire attention to the performance of his maneuvers.

Pay attention to the maneuver in progress and don't be distracted by pit crews, etc. The flier deserves your undivided attention. There is nothing more discouraging to a contestant than to realize that a judge is not watching his performance!

Don't be concerned about flying between maneuvers. It may be best not to even observe the flying between maneuvers since it may prejudice your judgment of the maneuvers.

Don't converse excessively with the flier before a flight. He is usually nervous—this state may be exaggerated by your questioning.

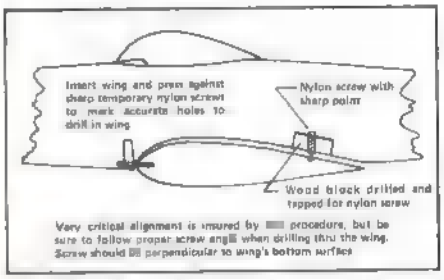
Do not take into account wind conditions when judging. A maneuver is a maneuver under whatever conditions performed. Everyone has the same handicaps and it all averages out.

Alain Tillian built test model of man-size hydroplane. Fast and fun. Rudder only.

Ignore the class in which a contestant is flying. There are some very good A fliers and poor D fliers. All maneuvers are measured against the same perfect scale. Do not let the flier's fame influence you; even Phil Kraft can put in a bad flight once and then.

Don't look into the sun when scoring a maneuver. If the plane flies into the sun you cannot observe that part of the maneuver, so downgrade accordingly.

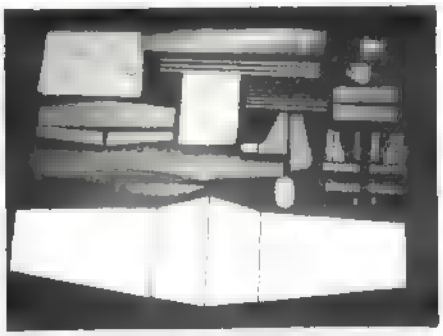
Wing Mounting Made Easy: Dick Simons of



the Fresno Radio Modelers reports a simple technique for aligning and mounting wings using the front peg-nylon screw method. After locating and installing the front peg, screw two pointed nylon (or other) screws into the tapped rear hardwood mounting blocks allowing the points to protrude about 1/8". Install wing, carefully align and press down firmly. You now have precisely located the two rear hold-down bolts. Remove and drill through wing.

STOCKWELL PYLON RACING

New Correspondent: AAM has lost the valued services of Bob Morse, who felt "wrung out" and asked for a replacement. Starting with this issue, the new correspondent is Bob Stockwell, editor for the National Miniature Pylon Racing Association (NMPRA News). Emphasis will be on people and events, with reports on the larger contests and information about who did what, where, and when. Pictures of exceptional airplanes and up-and-coming pilots will be published, along with information on new products.



PB Products nice FAI P-51 kit. Glass/foam.

BARKS Competition: The biggest event in California in May was the BARKS (Bakersfield Radio Kontrol Society) Second Annual Formula 1 Pylon Races. There were 71 entries, 108 airplanes (including backups) flying eight rounds in two days—that's about 120 heats, since they started out with 18 heats in a round and were down to 12 heats at the end because of attrition (what happens when radios go sour, interference strikes, some idiot turns on his transmitter while you're flying, razor-thin high-performance wing folds at number one pylon, competitors try to occupy the same airspace at the same time, and the like).

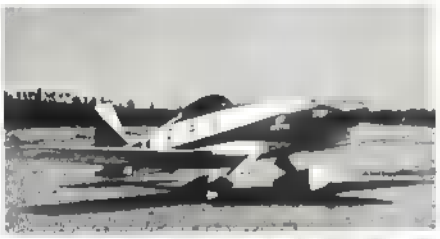
We want to commend the BARKS, and their water-minded RC friends, the Blue Dolphins—they cooperate. The Dolphins served as flagmen and counters along with the BARKS members. They also know how to run a contest. They come prepared with a handsome transmitter rack, phone system for all pylons and desk (so that all cuts get reported reliably). They set up air horns on number two and three pylons so that when there's a cut everyone knows it, including the starter on the tenth lap (preventing this nonsense where a guy wins the race by charging inside the number three pylon on the tenth lap and getting the flag before the cut is reported).

The BARKS don't waste half a day handicapping. The airplanes are lined up from

top to bottom, and the judges make an intelligent appraisal of their relative worth and assign them numbers which determine starting positions. (An experienced judge can line up 70 airplanes in an hour.)

Now the results. Terry Prather [illegible] first, earning it the hard way with [illegible] perfect score, beating everyone including Bob Smith, Jack Hertenstein, George Killeen, Joe Bridi, Joe Foster, Wayne Wainwright—and that's some kind of competition! His best time was 1:31.5 (against Smith).

Bob Smith later, with a $250 offer from K&B to anyone who could beat that fantastic Supertigre time, put in [illegible] more incredible 1:30.3, the most perfect flight I have ever witnessed. He [illegible] exactly over every pylon in all ten laps. It appeared that his 1:30.3 was 200 or 300 ft. shorter than the course Prather flew for his 1:31.5, simply because of the perfection of the flight. Smith ended up somewhere around 15th because of [illegible] couple of zeroes (he took two cuts and nosed over once).



Laminar-winged Minnow by Smith set new record of 1:30.3 at Bakersfield, May 23, 1971.

Roger Owens, also flying a hot Supertigre, was second. Part of [illegible] team with Prather, Roger is certainly the most improved and competitive flier in the game. Third was Mr. Reliable Jack Hertenstein—consistent, error-free, cautious, self-contained, and mightly hard to stay ahead of.

Larry Leonard and Joe Foster, who placed seventh and eighth respectively, were flying the new Shark, with its handsome elliptical wing. The kit (fiberglass fuse) is available from Francis Products, and is [illegible] beauty. Both Leonard and Foster were turning down regularly between 1:36 and 1:44.

FAI Fuel?: Do you think things [illegible] getting too fast? What kind of response will I get if I suggest we all [illegible] to FAI fuel? It would be [illegible] built-in headwind, equal for everyone. Engine development would proceed [illegible] before, but engines, plugs, fancy finishes, airplanes, and tempers would all last longer.

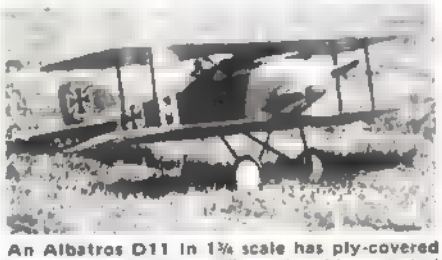
CLAUDE McCULLOUGH
SCALE

That Tears It: Maxey Hester solved the problem of duplicating the notched-edge tape used over ribs in fabric-covered airplanes without making [illegible] scale model of full-size pinking shears.

Remove the serrated tear strip from a waxed paper or aluminum foil box and bolt it to a piece of strap iron. Hold silkspan or onionskin typing paper down with this tool on [illegible] resilient surface, such as [illegible] tablecloth, and tear off narrow strips. Onionskin tears beautifully, with clean notches, but is hard to curve around wing tips (handles like Jap tissue). The silkspan is harder to tear but works better on curved areas. Both can be applied over ribs and edges with clear dope and are quite realistic. Since different brands and types of wrapping materials use a variety of sizes of tear strips, [illegible] search should turn up one with just the right number of tiny zig-zags in the desired scale.

The final touch in this technique is rib stitching on the taped areas. Put about an inch of Sig [illegible] aliphatic resin glue in a standard Austin-Craft glue gun, used without the plunger. As a drip [illegible] glue forms on the tip, catch it on the surface of the model and pull out into a string. It takes a little practice, but uniform replicas of the threads going across the tops of the ribs can be applied.

Right on: Quote from the Palm Beach Aeronauts News (remarking about Pete Peterson's Beechcraft [illegible] Taylorcraft):



An Albatros D11 in 1¾ scale has ply-covered fuselage, wire wing TE, and cable-operated ailerons, built by J. Swift.

"These models are certainly [illegible] commentary on large [illegible] models. It appears that the larger the better! This way you get lighter wing loadings, more realistic performance, construction is actually easier and the models at their reduced airspeed appear safer and easier to control."

On The House: Bob Gaede [illegible] pre-painted aluminum home siding material to make such scale details [illegible] landing gear doors, hatch covers and the like. It is .020-.025 thick and the baked-on factory finish will bend 180 degrees without popping off. The surface will take most model spray colors superbly. Check with a local installer who has scrap pieces; [illegible] will probably give it away.

Scale Data Sources: District [illegible] AMA Scale Contest [illegible] representative Russ Barrera [illegible] opening [illegible] Model Aircraft Museum and Library. It will display historic models and old engines and serve as [illegible] research center. The collection includes [illegible] of model magazines from 1935, other magazines and aviation books. Scale model plans total 600 and the number of three views on file is about 5000. He will provide copies of scale data material for [illegible] small fee. Make it easier on Russ by enclosing [illegible] stamped, self-addressed envelope with inquiries to 139 S. "B" Street, San Marcos, Calif. 92069.

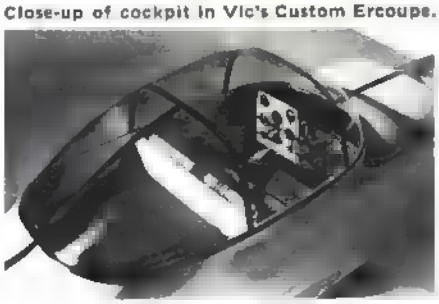
HOWARD McENTEE
FAI AND GLIDERS

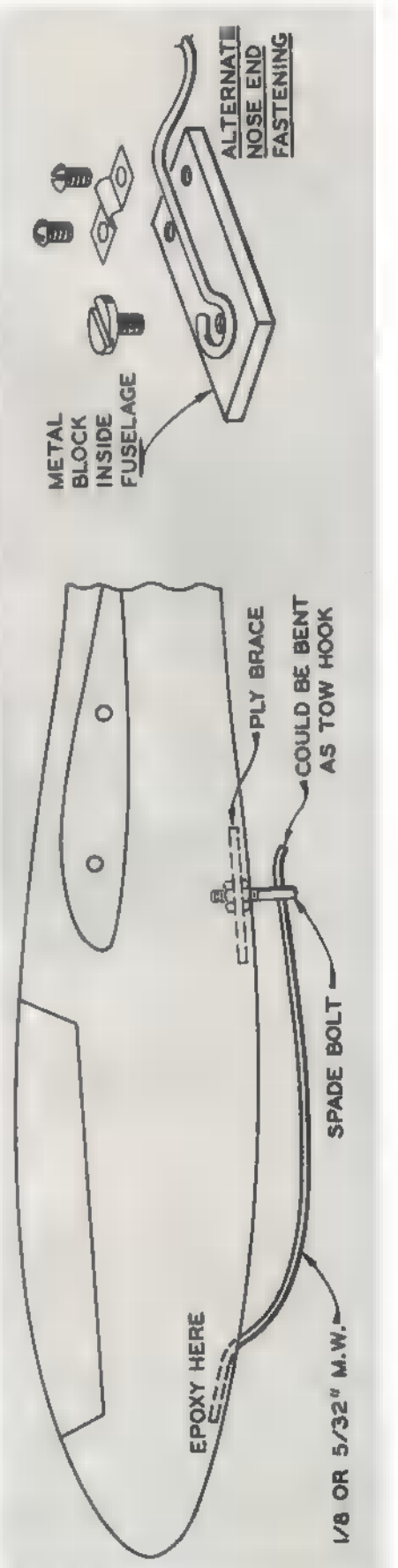
RC Glider Films: A lot of film, both [illegible] and movie, [illegible] shot at last year's unofficial glider meet at St. Charles, Ill., [illegible] the beginning of Nats week. Since RC fliers from all over the country were in attendance, including many "hotshots," the movie films should be of real interest to RC clubs looking for meeting program material.

During the Toledo Conference, Dwight Hartman (Argenta, Ill.) showed some excellent color movies of both the RC glider meet and RC events at the Glenview N.A.S. Nats. Copies of these films may be rented at reasonable cost from Dwight for club showing. Write for details.

AMA President John Clemens also [illegible]

Close-up of cockpit in Vic's Custom Ercoupe.





busy with his movie camera at both sites, and the AMA can supply films ■ follows: Nats RC Glider meet, 11 min. (135'); RC Pattern, Pylon and Scale (latter includes fabulous B-36 flights), 32 min. (400'). Both films ■ Super 8 color and with ten copies of each, there shouldn't be any wait. AMA clubs can send $7 for each film to the AMA Film Library at the Washington headquarters. Upon return of the film, $5 will be refunded.

A professional 16-mm color-sound film of the forthcoming RC World Championships will be made available through AMA for both club and public (via TV viewing). Jay Gerber heads this project.

New Launching Tricks: To speed glider launching for the 115 or more entrants expected at the LSF Soar-Lympics (Livermore, Calif., Aug. 28-29), Curtis Christen, Bob Andris and Gerry Wolfram have successfully tested multiple-speed electric winches which can get any glider conforming to FAI specs aloft in 20 sec., and ■ bring the towhook back to the launching site ready for the next launch in only 10 sec. Thus, it will be possible to put a glider aloft every thirty sec. on each of the four flight lines! Electric winch development has been aided by Frank Colver and Konrad Nierick of Harbor Soaring Soc., and John Converse of Santa Barbara.

With this rapid launch capability, the limiting factor will be radio frequency availability, the main reason why a maximum entry of 100, plus top 10 Scale entrants (and a few official guests) has been ■ for this meet. It had an entry of 85 in 1970 when over 500 flight were recorded.

Simple Nose Skid: Applicable to plastic or wood fuselages, the skid suggested by Bob Lopshire ■ mainly a piece of heavy music wire bent to desired shape. The nose end can be epoxied to the fuselage, or an alternate screw-type attachment, which allows complete removal when desired (for repairs) can be used. A metal block is suggested, since gliders almost always need nose weight. To work properly, wire must be able to change length slightly as it flexes when craft is landing; hence the rear attachment point is not solid, but merely acts as a guide. It appears that, if properly positioned with respect to CG and wing leading edge, projecting rear end of the wire could be bent to act ■ a towhook.

FREE FLIGHT

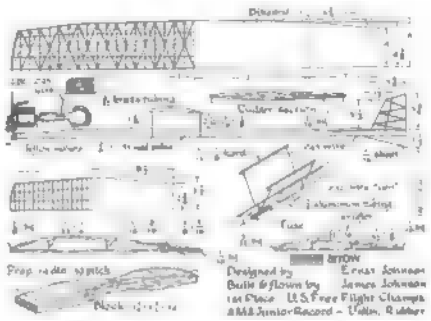
BOB MEUSER
SPORT

Super Arrow: The heads of the old pros shook in dismayed disbelief when Jimmy Johnson, age 13, won the Unlimited Rubber event at the U. S. Free Flight Championships over the Memorial Day weekend near Taft, California.

For decades, the recipe for instant success has been a model as large ■ the rules allow (300 sq. in.), as light as possible (3½ to 5 oz. without rubber), and as much rubber as the structure will stand (an amount at least equal in weight to the airframe). Such models will climb to 400 ft. in one or two min., and are a cinch to do an easy five to seven min. in "still air"—truly a glory to behold. When a ■ pretentious model wins, it is shrugged off ■ a lucky roll of the dice in what is, to some degree, ■ game of chance. Occasionally ■ small, ultralight model (a notch above ■ indoor type) appears, but the performance is usually disappointing.

A strong wind on the night before the Unlimited event at Taft blew the skies clear; by the ■ a.m. starting gun, the thermals were popping like popcorn. Between the thermals were the inevitable "holes" or downdrafts, and into those holes many models of the old pros were launched, for durations of ■ mere three min.

One of the few 5-min. maxes was recorded by Jimmy's little three-ft. stick model—hardly more than an overgrown Delta Dart. In due time he put up his second max, but ■ his attempt at a third ■, the wind collapsed the wing before the model could be launched. By the time repairs were made, the wing ■ even stronger, and it was doubtful if the model could survive another attempt. Jimmy and his father, Ernst, decided to carry the fragile wing to the launching area in ■ box, strapping it on



quickly and launching the model during one of the brief lulls. These tactics paid off, for Jimmy put up his third 5-min. max, went ■ to make his fifth 6-min. max, and finally hit ■ hole on his sixth. In the process of winning he set ■ national record that won't be beat in quite awhile.

Jimmy launches ■ Super Arrow. Seems more like a big Tenderfoot model than an Unlimited Rubber winner. Text tells the story.

Jimmy is no Johnnie-come-lately to high-performance stick models; he and his father have been flying ■ variety of them for the past two years. A model similar to Jimmy's won Ernst an award in the National Free Flight Society Design Competition a year ago. The Design Competition winner had a shorter motor stick, and ■ rudder mounted on top of, rather than behind, the stabilizer.

The sliced rib construction is simpler to build than it appears—some hints are given in January and September 1971 AAM. The diagonal ribs in the wing give great torsional rigidity and warp resistance, but they increase the weight and add to the building time. The wing can be built just like the stabilizer, then the diagonal ribs added before covering if the wing seems too flimsy without them. Start by pinning down the leading and trailing edges, add the bottom ribs (shown dotted in the plans), add the spars and, finally, add the top ribs.

The design of the thrust bearing is especially noteworthy. Two pieces of .045 dia. music wire are bent to a Z shape, bound with fine copper ■ galvanized wire to a piece of 1/16" brass tubing, 1/2" in length, and the assembly is soldered together—preferably with Stay-Brite. (See p. 34, June 1970 AAM.) The unit is epoxied to the motor stick and bound tightly with thread. The wires are easily bent with pliers to adjust the downthrust and sidethrust angles to give ■ proper climb pattern.

The simple, old-fashioned free-wheeling prop was made from ■ machine-cut blank. However, as they are no longer available, dimensions are given for a conventional propeller block. The 42" solid balsa motor stick carries ■ 36" motor consisting of eight strands of 3/16" Sig Contest Rubber (reddish-brown in color). Pirelli packs more energy but, consistent with its Mediterranean heritage, is quite temperamental, often suffering ■ nervous breakdown at half-winds. Sig, noted for its reliability, is often used for flying scale models, where a blown motor would be a major catastrophy.

After the proper wing location is determined by test gliding, the dethermalizer can be added. Aluminum foil is glued to the motor stick, extending about three in. fore and aft of the foremost wing wire. A ½" length of ¼" aluminum tubing is cemented to the side of the motor stick near the bottom. A piece of Sig dethermalizer fuse is inserted into the tubing, and the rubber band holding the front wing wire to the motor stick is strapped around the fuse. When the fuse burns through the rubber band, the wing's leading edge lifts to about a 45-degree angle of incidence, and the model descends in a frightening nose-down attitude. But the descent is slow, and there is seldom damage. A conventional tail-mounted fuse will throw a light model out of balance as it burns, and a forward-mounted fuse operating a pop-up tail requires a bit of rigging, so the pop-up wing is a neat solution.

Jimmy and Ernst intend to try a square-box fuselage next to see if the added effort results in greater duration, and later, a folding prop. We hope the following step will not be to increase the wing area to 300 sq. in!

BOB HATSCHEK
POWER

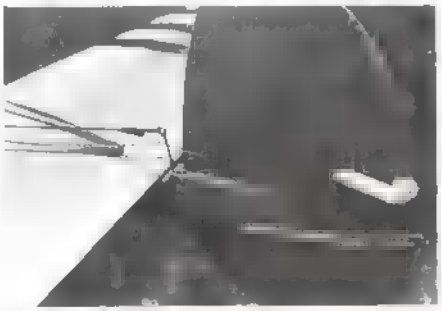
Autofeathers: A basic problem in the design of a free-flight power model, and in its adjustment for flight, is that it must operate at optimum efficiency in two widely different regimes: engine on and engine off. To solve this problem, top competitors are using programmed tail feathers, autostabs and autorudders.

It's true that many modelers sneer that they aren't necessary and then go on to win. It's also true that thermals can't tell whether a model has this potent gadgetry. However, autostabs and autorudders do help a model get higher, and they simplify the task of quickly trimming a model for fastest climb and lowest sink rate.

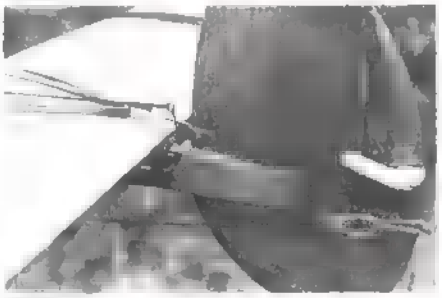
In practical terms, a model is adjusted to glide just below the stalling angle (where sink rate ■ minimized), and is adjusted for power flight ■ trifle above the angle of zero lift (where drag is minimized). The conventional way to do this is to push the CG ■ far aft ■ possible and reduce the model's decalage (difference between wing incidence and stab incidence) to a minimum. A little downthrust (with respect to the wing) and some turn for a spiral climb add to the power-on forces in such a way that the model isn't pushed over the cliff of longitudinal instability. The model is, however, right on the brink—showing typical long pullouts from any stall.

High-thrust line designs provide somewhat of a solution by increasing the nose-down couple under power, thus allowing ■ greater angular difference between wing and stab. But high-thrusts present some special problems of their own. A far better solution is the autostab-autorudder combination, permitting separate trim setups for both climb and glide—both optimum—and also allowing an altitude-gaining transition.

Reliability, weight, and the bother of making the gadget (in that specific order) are



Climb



Glide

Dethermalized

the problems of autofeathers. All three have been neatly conquered in a system designed by Bill Dunwoody and shown in the photos.

The first photo shows the setup for power trim. The stab TE is held down from below by what looks like a typical dethermalizer line, but which goes forward to the flood-off timer instead. A second branch of this line pulls in left rudder. When the engine timer releases this line, the stab TE is free to [illegible] up to the wire glide stop pivoted on the fin, and the rudder is free to swing over to the right. When the upper line is released by the dethermalizer fuse or timer, the glide stop pivots upward out of the way to pop the stab to proper DT angle determined by the limiting length of the autostab line.

Stab angles [illegible] ajusted as follows: Power trim is set by shims under the TE, and glide setting is varied by bending the glide stop arm on the far side of the fin either up or down. Rudder stops are simply shimmed.

Trimming the model [illegible] a cinch. A few hand glides provide approximate glide trim. The first power flight should be given no more than three to five sec. of engine run—long enough to indicate which direction to modify settings and short enough to be safe. Both power and glide settings can be changed after each test flight, or, when one is right, either can be adjusted individually. Believe it or not, [illegible] hot ship can often be completely trimmed in less than half a dozen flights.

A few tips about trimming for optimum performance with autofeathers: CG should be farther forward than usual for power models. Remember that glide trim [illegible] totally independent of power trim. This will give [illegible] much bouncier glide, more responsive to thermals and quicker to recover from upsets.

Power trim should aim for a very steep climb—70 degrees or more. This reduces velocity a bit, but lower drag and shorter flight path provide a new result of more altitude. The model should be thrown hard and at its climbing angle. It grooves better with [illegible] little turn under power, but no more than one turn for the entire power pattern. With the autorudder kicking in at the top, the model does [illegible] fast Immelmann turn, gaining still more altitude in the transition.

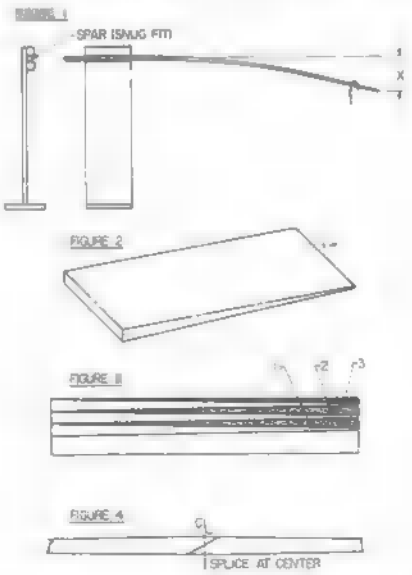
If the model has a fairly light wing loading, say a 250-300 sq. in. ½A, the auto release line can be let [illegible] at the same instant [illegible] the engine cut-off. But if the model is [illegible] dense, fast-moving one, like [illegible] FAI, it's a better idea to build in [illegible] slight delay between engine shutoff and tailfeather release.

BUD TENNY
INDOOR

Indoor Props: Unique among FF props, indoor props furnish motive power during the whole flight. In fact, whenever the rubber motor unwinds completely, the slow prop drags the model out of the air. Indoor props must be very efficient [illegible] low indoor model speeds, where input torque may be as low as .08 inch-ounces. They must also absorb over six times [illegible] much torque during the launch and climb-out. It has been found that if the prop flares (blades twist to high pitch) during the climb, it is easier to control the high power of the motor at the start.

How Much Flare?: The final choice of flare on an indoor prop is made by the stopwatch; each indoor flier must fly his model to find the correct flare. This learning process is greatly aided by carefully kept records of prop tests and measurements made during construction.

The Prop Spar: Prop spars control most of the structural characteristics of the finished prop. These may [illegible] round (sanded carefully to a smooth uniform taper), [illegible] they may have a rectangular cross section. Rectangular section spars [illegible] to give better performance, so the following deals with this type of spar.

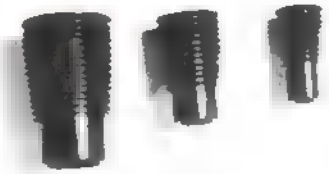


Deflection Test: To test the strength of a spar, the spar is supported at the center while [illegible] .01 oz. weight is hung near the end; the resulting deflection (distance X) is measured. (See diagram.) Check each spar by rotating [illegible] each side is up during one test; rectangular spars have more strength in one direction than the other. Keep [illegible] record of the deflection for each prop to determine how much is needed by models in your site.

Spar Slicing: Fig. [illegible] illustrates how ready-tapered spars [illegible] prepared. The balsa sheet is tapered along its length; a sheet will make half a spar, [illegible] it need only be about nine in. long. In Fig. 3, successive cuts to make three half spars are shown. The shaded portions represent waste, and the taper is exaggerated for clarity. Sliver [illegible] is the first cut, made so the grain in the sheet will run down the center of the spar. Note that 2 and 1 are twice as wide at the thin end of 3, so these will be exactly aligned with the grain. After these half spars are cut, they should be checked for deflection and matched as well as possible before they [illegible] joined. Fig. 4 shows [illegible] tapered splice joining two spar halves. After joining, make final deflection tests and lightly sandpaper spars, if necessary, to match the deflections.

WALT MOONEY
SCALE

No Excuses: From Williams Brothers, the makers of scale wheels, engines, pilots, etc., comes [illegible] new line of semi-scale cylinder details. Available in three sizes, they come packaged in units of five finned cylinders for small scale models. These will save all the time spent winding thread around dowels or soda



Williams' new plastic cylinder dummies.

straws and result in better-looking front ends on lots of interesting old aircraft models. No longer will an uncowled radial be an excuse for not modeling an interesting aircraft of the 1930's. They can be the basis of dummy cub-type engine installations, too.

Summer Program: The Key City Prop Twisters (Abilene, Texas) have had the good fortune of associating with Mel Neese, Abilene Dir. of Recreation, who, together with the Park[illegible] Department, is running a summer recreation program utilizing 1000 AMA Cubs. Local newspaper and TV coverage is helping to keep modeling in the public eye in Abilene.

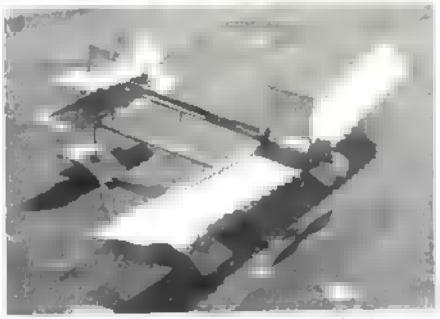
Duke Horn, flying his Cub, won Scale at the Prop Twisters Memorial Day championships. At this meet the Club put out a printed program supported by local business advertisements—a good way to let the spectators know what is going on.

Scale Seaplane Meet: The North American Flightmasters annual Scale Seaplane contest was great fun. As last year, the weather was perfect, and if all the models didn't take off perfectly, at least the modelers had the consolation of wading in the warm waters of Lake Elsinore.

Tschirgi's RC Brandenburg

Joe Tschirgi provided the piece de resistance with a beautiful Hansa-Brandenburg W-20 seaplane for RC. It even had a dummy spinning rotary which had to be removed prior to flight in the interest of improved propeller efficiency. The maiden flight was performed at the meet and, except for some aileron flutter due to a lost hinge pin, looked great. For all we know, even the aileron flutter may have been scale. The first W-20 (full-size, that is) was lost because of a structural failure.

Bill Stroman showed up with a rubber-powered model of the first hydroplane ever built. The Fabre hydro, a canard pusher with tricycle airfoiled floats and a biplane canard surface with twin rudders forward and ■ single rudder aft, had external truss-type spars. Constructed entirely of sheet balsa, it was a magnificent effort—and it flew too! Since all flights had to be ROW, that was quite an achievement. The model probably flew longer than the real one did.



Bill Stroman's rubber Fabre canard hydro.

Didn't do too well getting the winners' names because I was wading after my own water lover up and down the lake. Diesel engines can sure run a long time on a small tank of fuel.

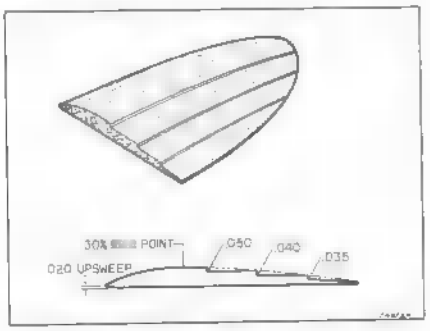
Worst crash was performed by McCraken's Loening which performed ■ beautiful ROW followed by two loops—the first tore off one lower wing and the second tore off everything else.

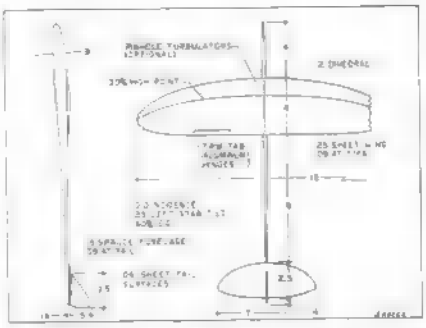
The model making the longest taxi was awarded the Alcoholics Anonymous "I'll stick to water" Award. The worst crash earned a trophy depicting a Duck stomping on a model.

Best of all, almost everyone had fun; worst of all, some refugee from an honor camp stole Russ Barrera's CO2-powered Deperdussin.

BOB STALICK
RUBBER AND GLIDERS

The Hand Launch Glider: Experimentation is one of the free flighter's fortes. Even the hand launch glider is continuously reworked to obtain that last and best improvement. Two cases in point come from the U.S. and England.





Several years ago, Larry Conover published information on his TGX glider, featuring a terraced wing. Based on experimentation by Dr. Lippisch, the concept was that the air flow is induced to remain attached to the wing longer than on ■ conventional smooth airfoil.

This concept didn't catch on in the U.S. but Roy Roberts, one of England's top hand launchers, set about experimenting with it on his version of Antonioli's Dolphin glider and found this airfoil improved ■■ duration. His experiments also included the addition of pinhole turbulators along the leading edge. The pinholes pierce the top surface but do not exit through the bottom surface. According to current information, he has yet to try pinhole turbulation on the TGX airfoil. Perhaps someone on this side of the pond will experiment. With or without, the Dolphin has been a successful glider with a pleasing shape that should encourage others to give it a try.

Other Hand Launch Gliders: Non-experimenters should also consider the newly-marketed hand launch glider kits by M ■ P Enterprises, 1222 Briarcove, Richardson, Tex. 75080. The Flash, U.S. Kid, and Polly retail at $1.95. Both Flash and U.S. Kid are Nats winners from 1970 and Polly is the current AMA record holder. ■ & P also sell as D.T. kit for H.L. and the Mini-Flash for eight-year-olds and older. Cost: $1.25. Kits ■■ complete and feature excellent selected wood.

Questions and Answers: Periodically, columnists lose sight of the beginner, and questions like the following from Gene Conner help us regain our perspective. "How," he asks, "can I find out about contests before they happen?" Read the AMA contest schedule in AAM or subscribe to AMA's Competition Newsletter for $3.00 per year.

"Is it advisable to cover both sides of wings?" Yes. The additional weight is negligible and the disruption of the airflow gives enough additional drag to make any but the slowest flying model fly poorly. Unless the model is designed to fly without ■ wing covered on the bottom surface, such as the Jedelsky style structure, covering only the top surface will usually warp the structure.

Unlimited Rubber Revisited Again: The controversy over restricting Unlimited Rubber has been reported in this column on two separate occasions. Dennis Osborne of Quebec supports the thought that restricting Unlimited Rubber is a paradox. He also writes in support of giant rubber scale. Dennis, some of the SoCal boys are already going strong with Super Rubber Scale; most of them are using the plans of bygone days, when rubber was king and gas-free flight was just appearing on the scene. These Old-Timer plans are available from John Pond.

CONTROL LINE

BILL BOSS
SPORT AND SCALE

Custom Canopy: Have you ever encountered the problem of finding the proper size and shape canopy to fit that new model? Well, you can make your own by following the simple procedure outlined below.

First step is to carve ■ wood male mold to the exact size and shape canopy needed. The mold should be very smooth as any irregularities will be transferred to the finished product. The finished smooth mold should then be glued to a slightly oversize flat board. A second board of the same size is cut out ■■ that it fits over the mold. Celluloid acetate is then fastened to the underside of this board. Use thumb tacks or small brads.

An external source of heat is now applied to the acetate. Heat until the acetate becomes soft. Caution—never use an open flame in this operation! A high intensity lamp is ideal. When the plastic becomes soft, press it down over the top of the mold and clamp or hold the two boards together until the plastic cools. When cool, trim off excess along the edges and fit your custom canopy to the model. Idea by Marv Wentz, Technical Editor, Aero Modelers of San Jose Newsletter.

Unique Scale Plane: The YF-12A ■ a delta wing jet aircraft made by Lockheed and has the distinction of holding world speed and sustained altitude records. The SR-71 is the reconnaissance version of this fantastic flying machine and the subject for a unique model by Rober J. Stratton SFC. Bob's model was

An unlikely aircraft to model is this very supersonic Lockheed YF-12A. See text.

constructed almost entirely of planking and block balsa. The fuselage is made of three 1/2 ■ 4 x 40" planks glued together and then shaped. Engine pods were hollowed to accept fuel tanks. Assembly of the entire plane was accomplished by notching the fuselage and engine pods to accept the wing sections. Epoxy glue was used throughout. Model was finished by using talc and clear dope ■■ a filler, then sprayed with a thinned epoxy solution. Final color was Enamel Lack, an enamel paint that dries with a highly polished lacquer look.

The completed model was 39 1/2" long, 25" span, wing area 165" sq., weighed 4.85 lb., and was powered by two O5 Max 19 RC engines. The model is reported to fly very well with the CG located about 1/2" behind the engine mounts. Bob reported that plans are under way for an RC version using 3/4"-1' scale, powered by ■ ducted fan system. The 3/4 scale would make the plane about 80" long with a span of 43".

Cold Weather Starting: The month of October brings the beginning of cold weather to many parts of the country and model engine starting problems. No need to heat engines with car exhausts or propane torches, says Bob Carlson. Prime the engine (exhaust stack only) with a few drops of white gas, a couple flips of the prop and the engine is off. Engines fire up easily with this method at 25-30 degree temperatures and has been successfully used in temperatures as low as zero degrees.

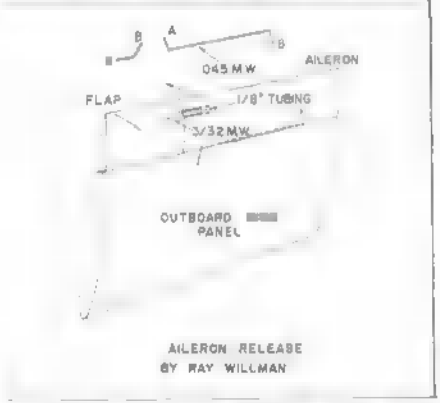
JOHN BLUM

CARRIER AND PATTERN

Arrested Landings: The Navy Carrier rules allow 100 points for a normal 3-point arrested landing. The rules cover a dead-stick, but [illegible] not specifically define an arrested landing for scoring. Assuming that [illegible] model fulfills all the aspects of a 3-point arrested landing, but that the engine quits and the model rolls backward disengaging the hook before there is any definite hesitation of movement, how is this situation scored? Must the hook be attached to the cable when the model stops moving?

Another situation arises when the model makes the perfect landing and comes off the cable allowing the model to proceed in rather erratic flight. Reasons for this can be (1) fast landing speed; (2) weak tailhook; (3) slack arresting cable; etc.

TAILHOOK SAFETY CATCH BY R.L. PERRY



AILERON RELEASE BY RAY WILLMAN

Richard Perry of Williams AFB, Ariz. handles the problems with [illegible] safety catch, as depicted in the sketch. He has never lost a cable after the addition of the catch. Richard is also a proponent of tri-cycle gear in Carrier which offers the following advantages: (1) the engine is more likely to continue running after landing; (2) aids in keeping the hook tight against the cable; (3) spring tension on tailhook will not lift tail off deck.

Control Line Tension: Enjoying the benefits of having your model maintain line tension during flight has promoted the creation of many methods. High speed, of course, doesn't present the problems of slow speed. The increased momentum of high speed helps keep the model where it should be. However,

Original design flown in Junior Profile Carrier by Mike Willman with brother Walt helping. S.T. 35 and 36" span.

the carrier model is often expected to fly at low speeds that would be considered satisfactory for landing in scale. This loss of speed is detrimental to the flying ability, with most of the drag forces trying to pull the model into the circle. So, in one order or another came the landing flaps, the dive brake, the auto-rudder, etc. As the ability arose to fly slower using a pressurized fuel system, the need for additional line tension methods became desirable. First came the landing flaps whereby the inboard flap traveled farther than the outboard flap, forcing the outboard wingtip down. Added security then [illegible] in the use of the ailerons which placed the inboard one down and the outboard one up, on slow speed.

Ray Willman, offers the following idea. The sketch shows the bottom of the outboard wing panel depicting [illegible] section of the landing flap and the aileron. The aileron is hinged and receives its activating force from [illegible] piece of .045 m.w. that has legs A and B bent at the desired angle of travel and imbedded in the trailing edge and aileron. This piece of wire then acts as [illegible] spring to force the aileron from a neutral to a raised position.

A piece of 3/32" m.w. is placed in the landing flap near the bottom surface with about a 1/2" exposed length. A piece of 1/8" OD tubing that has been split lengthwise [illegible] recessed into the bottom of the aileron. This piece of tubing is slightly [illegible] than half and [illegible] lightly closed along its length. With a well-aligned installation, when the landing flap is in neutral, the aileron can be snapped to hold neutral. The exposed wire fits snugly into the tubing for high speed, but will pull from the tubing when [illegible] spring-loaded flap [illegible] released, allowing the aileron to move upward.

Similar results can be approached by using a thin wire actuating method without the snap release so that the aileron [illegible] blown into neutral [illegible] high speed and approaches an upward position as the speed is reduced.

What About Lines?: The St. Charles Phantom Flyers' (St. Louis) Spring Contest drew nine contestants in Profile Carrier using .015 lines by the rules, which is [illegible] good turnout. However, with the heavier line rules in scale carrier, the GSLMA meet in June drew only two entries in each class, with eight in Profile. So, the line sizes in the 1971 rule book did make a difference. The effect of the recently revised rules will be interesting. Time will tell.

Really active club in Edmonton, Alberta, Canada, call themselves "Birds of a Tether." Ages 5 through 55, city-sponsored flying sites, and all control-line interests. What's your club like?

Edmonton, Alta., Canada: If looking for [illegible] club in this [illegible] contact Bill Harder, 210-10250 115 St., Edmonton.

HOWARD RUSH

COMBAT

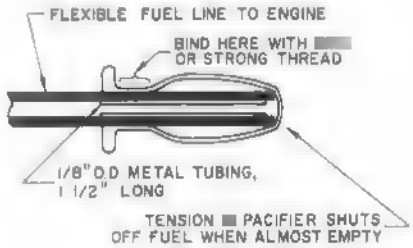
Big Money: To make Combat competition fiercer than usual, some clubs have been holding contests for cash. The Lubbock Texans and St. Louis Hot Heads both held money meets recently where income from entry fees was split among the winners of the top three places. The Acton High Fliers of Acton, Ontario, Canada, have [illegible] high-rolling annual contest with $250 cash for first place in Open Combat. The first of these meets, the Acton Combat Exposition, drew 60 contestants on Labor Day in 1969, and was conquered by Dan Patton of Cincinnati, longtime king of Combat in the Midwest.

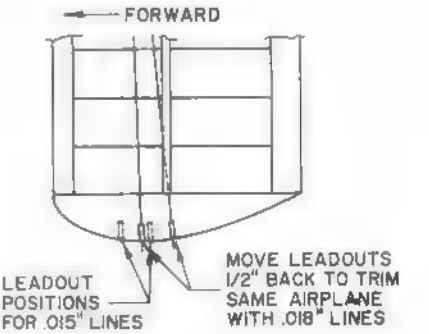
The biggest money meet yet, the World Combat Championships, will be held this

Correspondent Rush prepares Nemesis II. Karl Schilling ready to fill pen-bladder tank with strong calibrated syringe.

Labor Day weekend at the Whittier Narrows field, El Monte, California. Organizer Phillip T. Granderson has raised prize booty of $450 for first place, $250 for second, $100 for third, and $50 for fourth place by mid-June, with promise of more to come by the time of the contest.

No-Flood Baby Pacifier Tank: Also from Phil Granderson is [illegible] remedy for the problem of engines flooding out at the end of a flight with a pacifier fuel tank. Just before it runs dry, a pacifier has a pressure peak that can stop the engine by flooding it. Some engines refuse to start hot when flooded, so pit stops become long and difficult. Phil runs a piece of fuel tubing stiffened with metal tubing into the pacifier far enough that the tubing stretches the empty pacifier. When the fuel supply runs low, the pacifier wall covers the end of the fuel line and the engine stops lean. With this setup, Phil gets instant restarts on his hot Fox 36x engines.



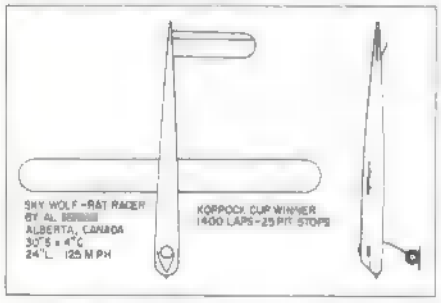


Trimming Planes For .018" Lines: The 1971 AMA rules change for control line dia. for Combat to .018" has made the event safer, but has caused some problems. Having more drag than the .015" cable previously used, .018" lines tend to aim the plane toward the pilot a few degrees. Because the .018's weigh more, centrifugal force on the lines tends to roll planes toward the pilot during maneuvers. Models can be made to fly straight ahead by moving the leadout guides on the left wing tip to the rear about 1/2" from the positions used for .015" lines. Adding 1/4 oz. of weight (the approximate weight of three U.S. pennies) to the right wing tip will balance the increase in weight of the new lines through maneuvers.

JOHN SMITH
SPEED AND RACING

Canadian Capers: Al Kraus tells of the Rat Race activities in Alberta, Canada. He flies a rat racer of side winder design, 30-in span, K&B 40 powered with which he won the Koppock Cup in Toronto. He placed second twice in the Trans Canada Rat Race (1400 laps, 25 pit stops, averaged 11 sec. per pit). Design is called the Sky Wolf. Top end about 125 mph. Al, a member of the Foot Hill Fliers (Alberta), is interested in a NCLS within the AMA. Some of you U.S. rat racers drop Al a letter to General Delivery, High River, Alberta, Canada. He has some good ideas that may interest you.

Write Your CLCB Member: Each month, AMA Competition Newsletter publishes many letters pertaining to new rules proposals. The latest at this writing, mid-May, contains a long list of rules proposals from Bill Pardue. Some, if passed, would really shake up CL Speed—regulation of fuels, outlawing of certain equipment, and a new method of classing contestants. This last idea, Novice, Advanced and Expert, would be a real pan of worms to regulate. Having to mark contestants' AMA cards after the contest, as to placing in the events, would add untold trouble and added work to already over-worked CDs and event directors.



If you have any comments on these or any other proposals, drop a line to your district CLCB member and state your opinion. Without your voice, they have no way of knowing your feelings. For those of you who do not subscribe to CN, do so—it's a very good source of information.

Blowing My Own Horn: My two oldest boys, Chris 9, and Jamie 6, flew their first contest, the Cleveland Sport Race, June 5-6. They flew a Cleveland-designed American Yankee by Bob Sargent. In three events, they placed 4th and 5th in 1/2A Proto, 4th and 5th in 1/2A Speed and Chris took first in Sport Race. (Rules in an earlier issue.) Both flew all Speed flights from the pylon, first time. They fly TD 049's with LH shafts—all takeoffs from the pylon. Both have been flying since September 1970, and had about 100 flights each on an 099-powered Stanzel trainer converted to two wire, before entering competition. Yes, a two wire, and now we go to a geared handle from Big George Aldrich. Anyhow, they made me pretty proud. Now let's see what the old man can learn from the kids.

Let's Share: Next month I am planning on giving a complete list of suppliers for speed, Goodyear and Rat Race equipment. I have also been getting requests for names and addresses of people who fly certain events. If a NCLS is formed, as I hope it is, one of the first things they could do is to start a registry of competition fliers giving name, address, and interest (CL Speed, Rat Race, Goodyear, etc.), and make it available, for a small charge to cover postage, to anybody who would request it. This would be a great way to share interests and ideas with others. Speaking of sharing, now that the contest season is well under way, how about some sharing of ideas and photos with me?

special interest

FRED MARKS
AERODYNAMICS, ELECTRONICS

Wood Props vs. Nylon Props: Nylon props have a habit of shattering when used on the large powerful 60 engines and, for this reason, most fliers have returned to wood props on them. The smaller engines (in my opinion, anything below the 40 size) can use them safely. Some insight into the cause of failure were presented by Vic Carlson in the "Capitol Flyer" (Ottawa).

"While doing some acceleration tests on transistors in which the specimens were subjected to 10,000 G loads, I began to appreciate the G loads the props we use. All the experts warn us about nylon props and maybe after reading this you will understand why.

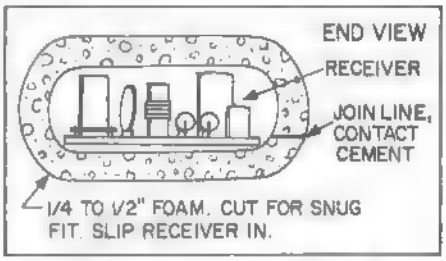
"I cut an 11-6 Tornado nylon through on the shaft line at the hub and found that half the prop weighed 12.8 grams. The balance point of the prop half was 2.04 in. from the shaft line and, assuming this to be the center of the mass, the G forces were calculated as follows for prop speeds of 10, 11, 12, and 13 thousand rpm. G is equal to .000028416 r n squared; r being the radius (in this case 2.04 inches) and n the rpm. The results are shown in the table.

Tornado Nylon 11-6				
RPM	10,000	11,000	12,000	13,000
G Force	5,796	7,014	8,347	9,796
Blade wt. RPM in Grams	74,189	89,779	106,841	125,389
Lbs.	163.6	197.9	235.5	276.4
Hub load lb. x 2	327.2	395.8	471.0	552.8

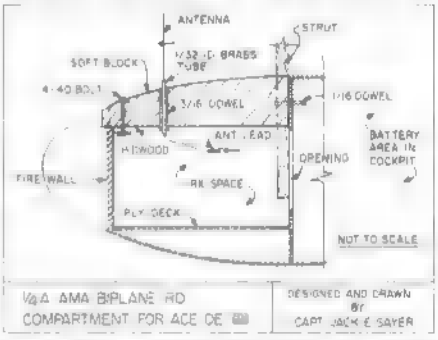
"Didn't know your engine weighed over 500 lb. on that super snorting 60, did you? So, when you are tuning the needle valve, keep your head out of the way.

"This isn't a complete condemnation of nylon props since we know they can take terrific punishment especially when they have been boiled in the recommended fashion."

Simple Lightweight Foam Sleeve For A Receiver: Take a piece of 1/4-in. to 1/2-in. thick foam and wrap it around the receiver to check for size. Cut to proper length, put contact cement on ends and join. Slip it over the receiver; no tape or rubber bands are required. An end cap may be contact-cemented if desired. This is ideal for small, uncased receivers such as the Micro Gem, etc.

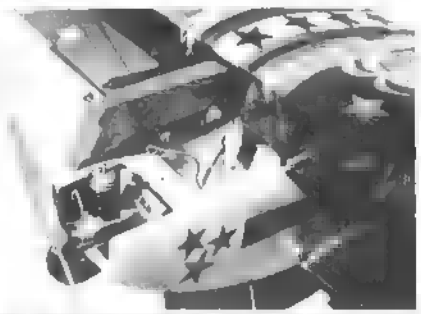


Flying Micro-Size Models: Jack Sayer submitted the modification to the 1/4A AMA Biplane shown. He writes: "At times I find that a lack of data or some better way in which to place new items of radio equipment. The original drawings of the AMA Bipe show no removable cowl. The forward compartment will just carry the ACE commander DE Superhet receiver in its new aluminum case. By using the cockpit area for the 225 ma battery pack and with a large



connecting opening in the bulkhead between the receiver compartment and cockpit, the setup now becomes quite interchangeable and compact. The after cockpit bulkhead has a hole in it to facilitate actuator wires running through it and made fast by Deans connectors to the receiver leads.

"The cowl block, made of soft balsa, is held in place by a 4-40 screw and bolt, plus a 1/16" dowel let into the bulkhead. All equipment can be made into separate units and connected by Deans connectors is my installation.



Jack Sayer's brightly colored rudder-only bipe with hatch described above.

"The main idea is to get to, remove, and service equipment with a minimum amount of trouble. Further, the 1/32" whip antennas should be kept forward of the wing for one reason or another. The antenna leads to the receiver are soldered to the base of the brass tubing and then to a Deans connector. Brass tube is epoxied in a hole drilled in the dowel. I have used basically the same method of antenna installation in all my RO models

(using doweling, brass tubing, small plywood seating plates) and have never had the slightest bit of trouble as far as installation requirements go.

"Did you know that AAM is the only modeling magazine for planes on sale here in the Bahamas?"

On Packing RC Equipment: By mail, I recently received ■ set from ■ gentleman in the Midwest and the postal department had done a real job on it! However, the primary reason was the packing. If the occasion arises to send a set to the manufacturer or anyone else, for any reason, please observe the following precautions:

(1) If the set came in form-fit styrofoam packing, keep ■ ■ long as you have the set and ■■ it for shipping.

(2) If it is necessary to pack the set in a box, always remove the transmitter antenna and pack it carefully in the box. Batteries which are not firmly restrained in the transmitter by a mount or strap should be removed from the transmitter and packed separately in the box. It usually isn't necessary to send along dry batteries. However, always include any nickel cadmium packs since they can be the source of problems which may seem to be caused by equipment.

(3) Use plenty of packing material. Wadded newspaper will do if enough is used and wads are kept small and compact. Large, loose wads tend to become compressed and let the equipment rattle around.

(4) Pack all system parts separately, don't wrap the receiver, battery pack, etc., together. Wrap each in packing, place in the box full of packing and keep separated.

LARRY ROBBINS
RC CAR RACING

Larry Robbins: The ROB of the ROBBEC Racing Team. For ■■ years I have been modeling everything from free flight through control line, tether cars, and RC planes to RC cars. My interest in cars included driving stock and dirt track cars in the early 1950's. Activities have included organization and management of clubs, officiating at contests, and currently acting as director of Series '71 East.

Bob Beckman: The BEC of the ROBBEC Racing Team. I've been building models for 38 of my 44 years. My RC experience started in 1948 and was inevitable since my education and profession involved electronics. In 1966 my son got me hooked on slot cars and I moved on to RC cars early in 1970. I like building cars and I love good, clean, head-to-head driving competition on the track. I believe in trying new things (and re-trying old ones) to improve performance. With that philosophy and active participation, our team is having modest success on the East Coast circuit.

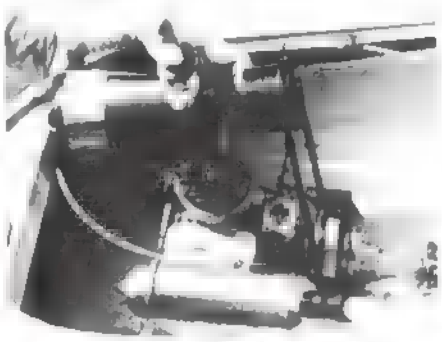
Scratch-built vs. Kits: A look at race results around the country shows that a large percentage of the winners are scratch-built cars, and the winning kit cars are often highly modified. Does this mean that kit cars aren't competitive or that scratch-built is the only way to go? Not so! We believe that the answer lies in the preparation of car and driver. There's ■ lot of cleaning, adjusting, and just plain tinkering that goes into tuning ■ car to racing pitch. Tinkerers come in two basic schools: those who would rather build (or radically modify) ■ car and then tinker with it; and those who would prefer tinkering with what's there. Until fairly recently, the second school hasn't had much to work with, so the first group has had ■ head start. There's ■ lot to work with now, and the guy that's willing to put in the time and effort can field ■ kit car that will run with the best of the scratch-builts. As we go along, we'll try to pass ■■ all we learn about car preparation (and driver prepping, too).

CLIFF PETERS
RC BOATING

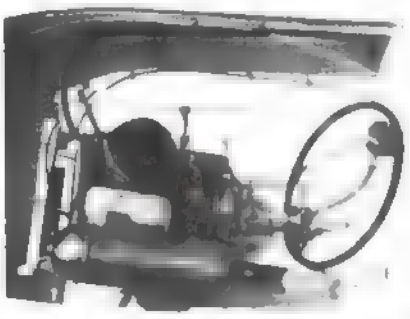
Every Engine Can Start Easily: Watching a model plane flier start his engine in a second or two with an electric starter, it was apparent that, with slight modification, the same technique could be applied to boat engines—in ■■■ case a Webra 61 Black Head.

Using ■ Penford Auto-Start and an "O" ring, the results were better than expected. We haven't been troubled by hard starting, flooding, humidity changes nor has the little priming can been used, after two years use.

The photograph is sufficiently explanatory, ■■■ a few tips may help. Make a 1/16" groove in the Penford motor's plastic adapter about ■ quarter of an inch in from the outside edge. Slip ■■ "O" ring (size depends



Hold starter motor ■■ nearly parallel with engine shaft as possible and push the button. Pull up the "O" ring to tension as necessary.



When not in use, hang ■■■ ring ■■ out of the way of the shaft and universal.

on boat requirements) around flywheel. Locate ■ small hook to hold the "O" ring when it is not in use. "O" rings can be obtained from any swimming pool supply store. We paid 49 cents for ours two years ago, and it's still as good as new.

Snack Stand Becomes Boat Stand: The snack stand so popular during the early days of TV when family and friends spent entire evenings watching the tube has a useful model boat application. With the addition of two strips of upholstery webbing it becomes an excellent boat stand.

It will keep t■■ boat well off the ground at an ideal height for all miscellaneous adjustments, minor repairs and just plain drying out after running and before putting it back in the car.

JOHN BURKAM
HELICOPTERS

Baby Is Growing: Dan Banks wrote, "In my opinion, **AAM** is the best model aviation magazine available. Therefore, it should include a regular section dealing with the new born life of the RC helicopter, for this baby is growing up fast. Let's not miss its youth." Who can argue with that? And so I was delighted when asked to write this column.

Background: Model airplane builder since 1932; model helicopter builder since 1943; in the helicopter industry since 1947; M.S. degree in aeronautical engineering.

Second helicopter built (the first one able to take off), was ■ nine lb. FF, seven ft. rotor, powered by Forster Super 99. At first unstable, its flapping blade rotor was replaced by ■ Bell-type rotor with stabilizing bar, and ■ few successful flights followed. My experiments with rubber-powered helicopters showing need for the stabilizer bar were described in **American Helicopter Magazine** (July, 1948).

In 1965 the RC bug hit me and I designed ■ 70-in. Lockheed XH-51A which won its class in the **RC Modeler** design contest and was later published in **The Challenge of R/C Scale.** (Not built, not de-bugged, not recommended.) Next a 24-in. Pee Wee 020-powered helicopter was built and placed fifth at the 1966 Nats—only gear-driven helicopter there. Plans for it, "High Time," were published in **American Modeler** (June, 1967).

Super Susie, my first successful RC helicopter flew in spite of high wind and unskilled pilot for the first official world endurance record at the 1969 OC/RC Symposium. A paper on model helicopter design was presented at the symposium. Penni, a 16-in. rubber-powered helicopter was also flown in the auditorium to illustrate helicopter stability. Plans for Penni appeared in AAM, (January, 1970). Another article on RC helicopter design was in the March 1971 AAM.

John readies the DSE-1 S.T.23-powered five-pound model for last flight. He optimistically carries a three hour fuel supply.

■y latest model, DSE-1, ■ five ft., five lb. hingeless rotor helicopter powered by Supertigre 23, responds well to the controls and shows promise of being able to carry at least a three hour fuel supply. A Lockheed-type control gyro is the stabilizing and control device.

Most Often Asked Question: "How do I get started in RC helicopters and where can I get plans?" For ■ starter, get used to the idea of a lot of hard work, and come to some agreement with your wife on how much time may be spent on helicopters and how much on home and family. Once that helicopter bug bites, things tend to get a little out of hand.

Start learning about helicopters from books and from the articles mentioned above. (I ■■■ supply copies of those out of print.) Begin building rubber-powered FF models and find out why all helicopters are unstable without some kind of gyroscopic stabilizing device. Then go on to powered FF models, maybe a control line helicopter (logical step between FF and RC, although I've never heard of it being done, have you?), then RC. Object is to solve problems one or two at a time, not forty at once as on starting out with a 40- or 61-powered RC helicopter.

Editors Note: John Burkam is also quite knowledgeable on FF helicopters and welcomes FF helicopter material and comment. He also thinks a CL copter is possible. Autogyros also covered.

This stick and tissue job is designed for learning and flying. Clear step-by-step instructions and building-sequence photos make construction most enjoyable.

Baby Biplane

by GEORGE WILSON

The Baby Biplane is an "advanced beginner's" project. Simple to build, stable in flight and possessing more than its share of eye appeal, it should attract many of our more experienced builders as well as the novices. It's a great change-of-pace project and shouldn't take an experienced builder more than four hours to build. We did Biplane No. 2 in two evenings and a Saturday morning, taking pictures as we built.

If any of you were active in the early 1930's, you may remember a model that looks like the Baby Biplane. For many years your author has been looking for the plans of a model, kitted by Comet in the thirties, called the C-1 Pursuit. We finally gave up and decided to do our best to come up with a similar design, with hopes that memory will serve us well after more than thirty years.

The C-1 Pursuit flew well in the thirties and its modern counterpart at least duplicates its performance. The Baby Biplane, designed to fly stably, has lots of dihedral and generous fin/rudder area to make up for its short tail length. The upper wing has considerably more incidence than the lower one; the result is a gentle stall. For my novice readers, this means the front wing loses its lift (stalls) when the model tries to climb too steeply. The nose drops as a result, and the tendency to climb too much is automatically controlled. In monoplanes and poorly designed biplanes, violent stalls can lead to disaster.

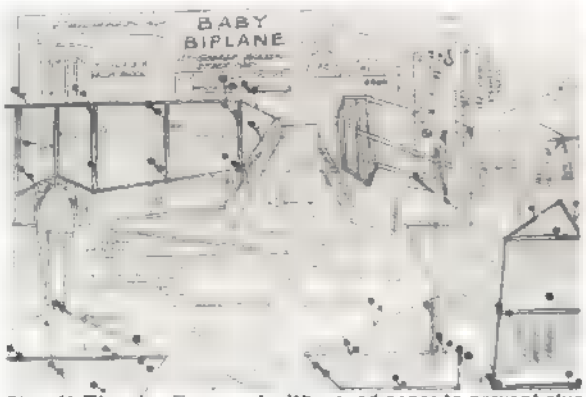
The gentle stalling characteristic and the ability to crowd a lot of wing area into a small space were two of the most important biplane characteristics. These factors made the biplane design the overwhelming choice for fighter and aerobatic airplanes for many years.

Personally, your author has another reason for liking biplanes. In the mid-thirties, Clarence Chamberlain "barnstormed" a Curtiss Condor into Squantum Airport at Quincy, Massachusetts and sold airplane rides on a Sunday afternoon. That afternoon I had my first airplane ride—in a biplane capable of carrying about ten passengers. It had two engines, one on each of its lower wings; it vibrated so badly you had to keep your teeth clenched or they chattered as if you had a bad case of the chills!

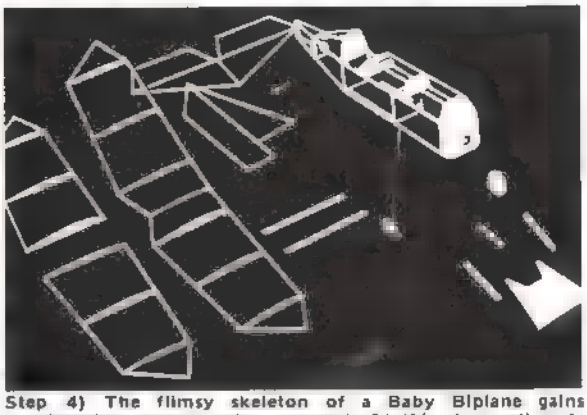
Construction

The Baby Biplane is easy to build. A simple three-strut cab and structure and a jig arrangement make mounting the upper wing a simple task. You'll need a single-edged razor blade or hobby knife like X-acto makes, a pair of pointed-nose pliers, a ruler, a brush for applying dope, fine sandpaper, a razor saw or jeweler's file and some fine pins (we like the ones with glass bead heads). The materials are described in the material list and can be obtained in most hobby stores. Ask your dealer to help you select medium-weight straight grain balsa.

With the exception of mounting the windshield, propeller and wheel bearings, we prefer building with Titebond glue. However, any white glue (Sig, Ambroid, Elmer's, etc.) will work well. Conventional model cements will also work, but they tend to take longer to develop working strength. The propeller and wheel bearings should be installed with epoxy cement if available. Otherwise, for all areas



Step 1) The plan is covered with waxed paper to prevent glue from sticking to it. Wing ribs and other parts were cut out with templates described in text. Parts are now being assembled.



Step 4) The flimsy skeleton of a Baby Biplane gains considerable strength when covered. At this stage, all parts must be given final sanding and one coat of clear dope.

Step 2) More wing parts are made and second fuselage side is assembled. Wheels are made of balsa with brass tubing for the bearing. A drop of glue retains them on the gear wire.

Step 5) With all parts covered, bottom wings may be glued to the fuselage and blocked for proper dihedral. Rudder/stab unit is mounted and aligned. Rear cabane strut is also glued in place.

Step 3) Fuselage sides are assembled upside down over the plan. Four sets of cross braces are glued in place; top is assembled with half-bulkheads and stringers.

Step 6) Top wing mounting is quite easy and accurate using the cardboard template. Note use of pins to hold alignment before gluing in the struts. Windshield also braces the rear strut.

use a good model cement like Ambroid or Aerogloss.

The first step in building is to make templates of the wing ribs, fuselage formers, rear motor support, and the jig for mounting the top wing. Bond paper makes a good template. It is sufficiently translucent so that with a good light you can trace the ribs, formers, motor supports and jig from the plan. (A glass-topped table with a light underneath is a helpful arrangement for tracing.) Cut the templates out with scissors; glue them to a piece of cardboard and cut out again.

The wings, tail surfaces and fuselage sides are built directly over the plans, using waxed paper to prevent the structures from sticking. Construct the rudder, one left wing panel with the leading edge missing, the top right wing panel with the leading edge projecting to the left for later use by the left wing panel, and the right half of the stabilizer with the center spar projecting to the left for later use by the left hand stabilizer panel. Allow these parts to dry before unpinning them; Titebond-glued work can be unpinned in about an hour.

The plan is now free to complete the top wing and stabilizer and to construct one fuselage side and the lower left wing. Tilt rib R-3 to allow for the wing's dihedral angle. Put dihedral in the top wing by cracking the leading and trailing edges (nick them on the bottom with your razor first) and bending up one side. Using waxed paper to prevent sticking, apply glue to the center joints, pin one side to the work surface, block the other tip up one in. and let the assembly dry.

The lower right wing is built over the plan for the top right wing—both top and bottom wing panels are, of course, alike. Don't forget to tilt rib R-3 for the dihedral angle. The second side of the fuselage can also be built at this time.

While waiting for the glue to dry, bend the wire parts and cut the brass tube bearings. The landing gear is bent using the layout on the plan as a guide. Then, the top is bent to be flat with the bottom of the fuselage at the two points marked on the plan. Bend an "L" on the front end of the skid where it bridges across the fuselage for easy gluing. Use 1/32 wire for the tail skid if 1/64 wire is not easily available. The brass tube is cut with a razor saw or by filing a notch in it and breaking it at the notch. File or saw the ends of the bearing tube flat and square.

The fuselage is put together upside down over the plan. The cabane and interplane struts are cut from 1/16 x 1/8 balsa using the full-size layout on the plan. Don't forget the 1/16 x 1/8 balsa pieces on the lower sides of the fuselage, where the root ribs of the lower wings will be attached to the fuselage. Remove the fuselage from the plan and add the top formers and stringers.

Rough cut the nose block and lightly glue it (a tiny dab will do) to the front of the fuselage. Give it a final sanding along with the rest of the fuselage; then remove it, attach Former F-3 and mount the propeller bearing. The down and right thrust angles are not critical but about 3 degrees each way is about right for a two-strand 1/8 flat rubber motor. To get the side and down thrust, just angle

Step 7) A pair of Baby Biplanes. Note that plane at right has light balsa prop but Williams plastic wheels. All color is in the tissue. (One can buy some wildly colored tissue, too.)

LIST OF MATERIAL

Quantity	Description	Use
5 strips	1/16 sq. by 36" Balsa	Wing, tail & fuselage construction
18 in.	1/16 x 1/8 Balsa	Struts & lower wing mounts
1 block	1 x 1 1/2 x 3/8	Nose block
1 sheet	1/16 x 3 x 4 Balsa	Rubber support, fuselage formers, wheels, cockpit & wing ribs
1 sheet	Japanese tissue	Covering material
5/8 in.	3/32 dowel	Rear rubber anchor
1 sheet	1/2 x 2 1/4 x .010 Celluloid	Windshield
12 in.	Thread, light	Binding for landing gear
15 in.	1/8 flat rubber	Rubber motor
1 each	6" plastic propeller (Kaysun or Williams)	Propeller
1 in.	1/32 ID brass tube	Propeller & wheel bearings
12 in.	1/32 music wire	Landing gear, propeller hook & tail skid
2 each	1/32 ID brass washers	Propeller bearing
-	Clear dope	To attach Jap tissue
-	Glue (Titebond, model cement and epoxy)	General construction, epoxy for nose bearing

LIST OF TOOLS

Razor knife or single-edge razor, pliers, model pins, brush (to apply dope), fine sandpaper.

the bearing in the nose block.

The landing gear is attached using a few turns of thin thread to bind it, in addition to a generous coat of cement. It's best to omit the tail skid until the bottom wings are attached.

At this stage, all the structures should have been completed and are now ready for covering. Use light tissue which tears easily when wet or doped (while the dope is wet).

Cut out tissue to fit each area to be covered and give yourself an extra 1/2 in. all the way around for trimming off later. Starting with the stabilizer, carefully put a coat of clear dope on the side of the structure to be covered and let dry. Lay the tissue on the waxed paper, redope the stab and immediately lay the frame over the tissue, pulling out any big wrinkles. (Incidentally, if the tissue won't lie flat because of creases or wrinkles, you can have Mom iron the tissue before beginning the covering job.) When dope is dry, trim the excess with scissors or razor blade.

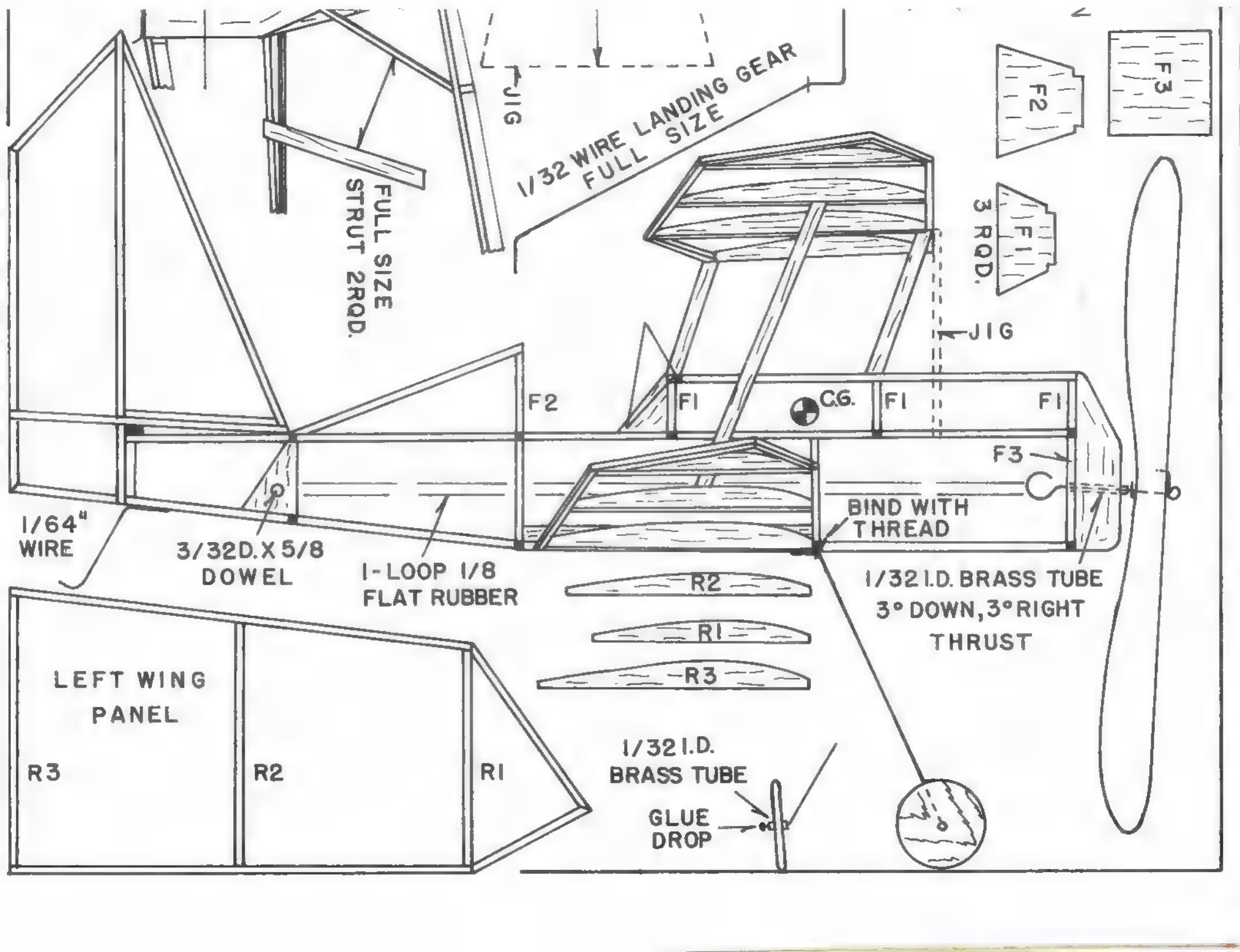
Repeat same process for the rudder. Remember, cover only one side of the stab and rudder. You will use the covered stab with the tissue on top, and the rudder with the tissue at the right side. Don't dope the tissue between the spars and ribs.

The fuselage is covered similarly. Predope the entire structure first. Start with one side, redoping the frame, carefully laying the tissue over the still-wet dope and smooth out. Pull out only the big wrinkles. Trim excess tissue when dry. Repeat the same process for the other three sides of the fuselage. Now spray a very light mist of water on the tissue on the fuselage, trying not to soak it. Hang it up to dry. The dampness will cause the tissue to shrink, pull tight, and any wrinkles will disappear. Dope the open frame areas of fuselage tissue with thinned dope (half thinner and half clear dope). Do all sides at the same time, then hang up to dry. This coat of dope adds a lot of strength, so one coat is enough.

Having gained some covering experience while working the stab, rudder and fuselage, it is now time to cover the wings—they are more difficult but the process is the same. Start with bottom wings first; dope the structures and let dry. Lay the tissue on the waxed paper. Redope one wing panel, then immediately ease it accurately over the tissue, touching the trailing edge, the ribs and leading edge. Pull out any wrinkles. If you need more time to ease the wrinkles out, use thinner on the doped spars to release the dope. With a small airfoiled wing, a beginner is bound to have some wrinkles in the covering, so don't worry about them too much—only the most experienced modeler can avoid the wrinkles.

The top wing, with its dihedral, will be the most difficult. Dope the structure and let dry. Cover the right wing panel first, then the left. Redope the right wing structure and immediately take the tissue and gently place it over the wing frame. Pull out wrinkles, carefully handling the center rib. When dope has dried, trim the edges and the left side of the center rib. When covering the left side of the top wing, you must carefully align the tissue; overlay the tissue of the right panel at

(Continued on page 86)


JIG
1/32 WIRE LANDING GEAR
FULL SIZE
F2
F3
FULL SIZE
STRUT 2RQD.
3 RQD.
F1
JIG
F2
F1
C.G.
F1
F1
F3
BIND WITH
THREAD
1/64"
WIRE
3/32D.X5/8
DOWEL
1-LOOP 1/8
FLAT RUBBER
R2
R1
R3
1/32 I.D. BRASS TUBE
3° DOWN, 3° RIGHT
THRUST
LEFT WING
PANEL
R3
R2
R1
1/32 I.D.
BRASS TUBE
GLUE
DROP

MAXEY HESTER'S WORLD-FAMOUS
RYAN STA SPECIA

AN OUTSTANDING KIT OF THIS CLASSIC

✓ CHECK THESE SPECIA

KIT RC-27 WINGS

- ☑ FORTY-THREE FORMED PLASTIC PARTS — Engine Cowling, Landing Gear, Wheel Pants, Fairings, Air Scoops, Headrest, Streamline Covers, Etc., made from tough, easy-to-finish ABS plastic.
- ☑ NEW TYPE, REALISTIC APPEARING INSTRUMENT RINGS — The identical parts that brought a perfect score for scale fidelity at the World Championships.
- ☑ SHARP, CLEAR, INSTRUMENT DIALS — All instrument dials and cockpit placards are reproduced photographically for exact scale fidelity and appearance.
- ☑ BIG INSTRUCTION BOOK — Features 100 isometric views and photos describing each construction step. Complete information for duplicating the world championship quality detailing of the prototype model.
- ☑ THREE GIANT 37" x 49" CONSTRUCTION DRAWINGS — Highly detailed layout plans and patterns of all parts.
- ☑ TWO 13½ x 18" 3-VIEW DRAWINGS — Extremely accurate drawings scaled from the prototype aircraft. Complete coverage of color scheme, markings and details.

AL RYAN KIT FEATURES

S." AN 72" ENGINE .60

- ☑ CONTROL-LINE CONVERSION DIRECTIONS — The Ryan will make an outstanding control-line scale project with good flight characteristics.
- ☑ DIE-CUT FORMERS AND RIBS — Accurate, clean-cut parts to speed construction.
- ☑ QUALITY SIG BALSA FOR STRUCTURE AND PLANKING —
- ☑ SHAPED AND NOTCHED TRAILING EDGE, AILERON AND FLAP PARTS —
- ☑ PARTIALLY SHAPED FUSELAGE SIDES —
- ☑ SIG ALUMINUM MOTOR MOUNTS —
- ☑ FORMED LANDING GEAR —
- ☑ SPECIAL SCALE SPINNER AND BACKPLATE —
- ☑ EASY-TO-USE FLYING WIRE MATERIAL —
- ☑ PLYWOOD, PLASTIC, HARDWOOD, HARDWARE, ETC. —
- ☑ AUTHENTIC, COLORFUL DECAL SHEET — Features Trade Marks, Air Show Insignia, Flags and Numbers.

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A BRAND NEW KIT OF AN OLD FAVORITE

PIPER J-3 CUB

FEATURING ONE-PIECE WING

UNIQUE WING MOUNTING FEATURE
Puts No Stress on Cabin Structure

KIT RC-3
$22.95

THE PERFECT TRAINER
VERY STABLE AND EASY TO FLY
A NOVICE CAN SAFELY FLY THE CUB

- Shock-Mounted Wing Panels
- Authentic Decals
- Authentic Scale
- Fully Detailed
- Full-size Detailed Plans
- Die-Cut SIG Balsa and Plywood
- Molded Engine Cowling
- Die-cut Windshield

The J-3 Cub has long been our best selling R-C kit. The re-designed kit makes it better than ever. A unique wing mounting does not depend on the cabin structure for strength. In spite of the fact it is an accurate scale model, it is so stable that it makes an ideal trainer. Simple structure makes an easy-building model.

AN AUTHENTIC R-C SCALE MODEL

of Hazel Sig's CLIPPED WING CUB

WINGSPAN 56"
LENGTH 42"
FOR ENGINES .19 to .35

KIT RC-26
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- Standard Balsa Construction
- Strong One-Piece Wing
- Molded Engine Cowling
- Authentic Decals
- Formed Landing Gear
- Full-Size Detailed Plans
- Aluminum Engine Mounts
- Die-Cut SIG Balsa and Plywood

The full scale airplane is a Reed Clipped Wing Conversion, built up from a 1941 Piper J-3 Cub for Hazel Sigafoose, co-owner of Sig Mfg. Co. The airframe was completely rebuilt and 3½ feet removed from each wing panel. With a 75 hp engine, the result is a highly aerobatic airplane that is really a joy to fly. With its blue and white sunburst paint job it is a great crowd pleaser.

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SEE YOUR DEALER FIRST! If he will not supply you, then order directly from our plant. We will ship promptly. To Order, please add $1.00 for postage and handling in the U. S. Canadian orders please add $1.50. Minimum order is $1.00. Please remit by bank draft, check or money order. Print your name and address plainly. Sorry, No C.O.D. shipments. All prices subject to change without notice.

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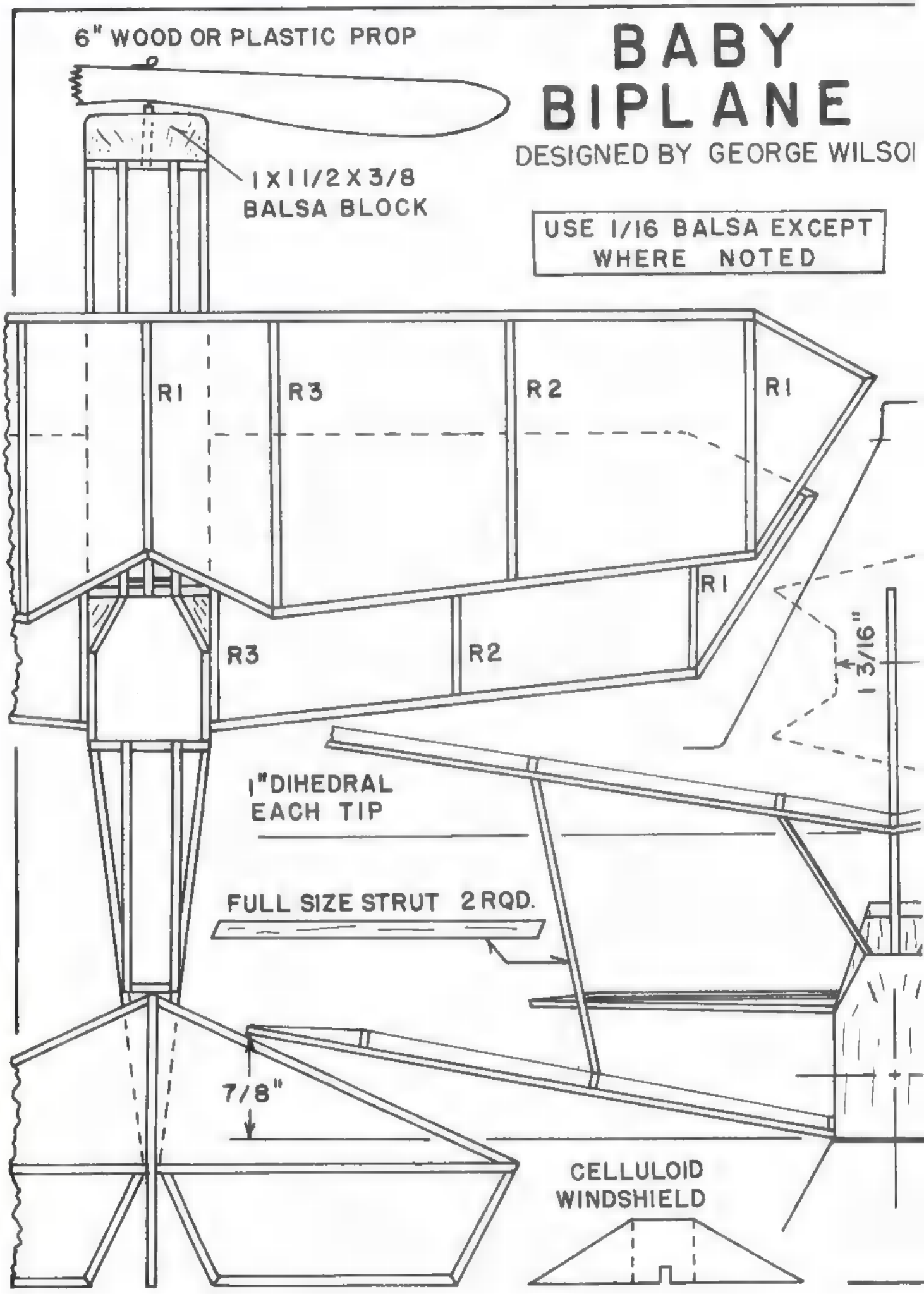
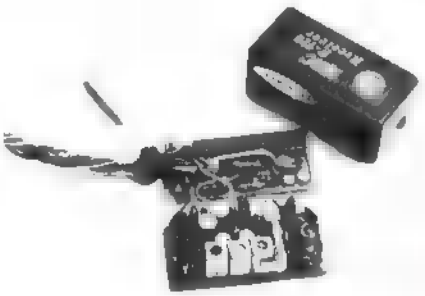
BABY BIPLANE

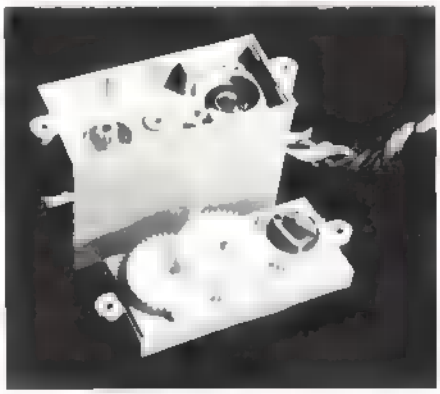
DESIGNED BY GEORGE WILSO

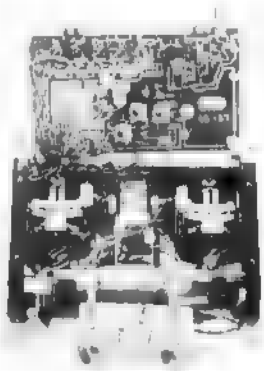


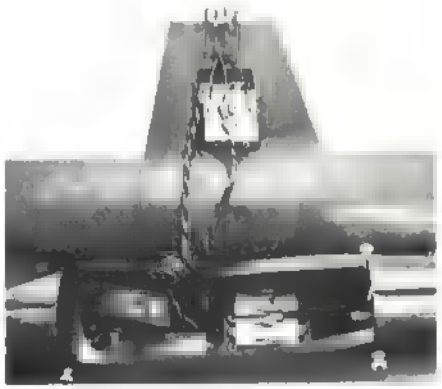
Blue Ribbon Review

NEW MRC F-710 FIVE-CHANNEL IN A 200-FLIGHT SHELL FLY









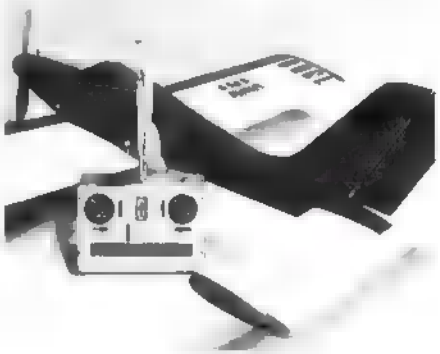
New compact receiver package with field-changeable crystals, IC decoder, and improved sensitivity/selectivity.

Tougher plastic servo construction with all-new amplifier is fast and accurate.

Transmitter much improved with smooth plastic stick assemblies. More RF power, lower battery drain and fewer cells.

MRC set fits nicely in Shell Fly. Note excellent plastic rubber band retainers.

Our flap-fitted Shell Fly is a real veteran. An early MRC set, it flew for over a year, then we installed this [redacted] one. Over 200 flights have been made on it.



by FRED MARKS

About a year and a half ago, we reviewed the MRC F-700 digital system. The system reviewed here gives an indication of typical changes in digital systems. At this time, we can safely say that the MRC system and the Shell-Fly airplane is one of the most thoroughly tested combinations presented in a magazine. The original F-700 was flown in the airplane regularly during the past year and, when the new F-710 was obtained, it was mounted in the same plane so that test-flying could begin immediately. We had some specific criticisms of the older set which we presented in the original review. We are pleased to say that the things criticized have been corrected.

The F-710 is a five-channel set which is the top of the MRC line and is, in my opinion, a deluxe system. The transmitter features a stylish, comfortable case which balances extremely well when the antenna is extended. The antenna is angled upward at 45 degrees from case centerline so that, when the transmitter is grasped, the antenna is near the vertical to present the optimum radiation pattern. The antenna connector is quite solid and is one of the most positive seen on any system.

The transmitter case measures 7 1/2-in. wide by 6-in. high by 2 3/4-in. thick, but is actually octagonal in cross section—quite thin and comfortable to hold. Made of metal, it is cold to the touch in cold weather. The stick assemblies have electronic trim built in that provides trim width of about 15 percent of full travel. This is excellent and corrects the "too little trim" criticism of the earlier system. Stick action is as smooth as any we have encountered. A twelve position detent mechanism is provided for throttle setting, with throttle trim, sufficient to cover about three detent positions.

Other physical features of the transmitter include a readily visible battery charge indication lamp, and a stylish RF output meter. The fifth channel lever is located below and to the left of the meter—an ideal location, as it can be actuated with the left thumb without having to fumble. Our flight tests of the Shell Fly included recent incorporation of landing flaps, and the power switch which now has a guard that protects against inadvertently turning the transmitter off.

The transmitter has been modified electronically for improved RF band shaping—partially to improve output and efficiency, but primarily to permit the new feature of field-changeable crystals. The F-710 is now available on both 27 MHz and 72 MHz bands. Crystals for the 27 MHz band may be interchanged, in matched sets only, between all five frequencies. On the 72 MHz band, this feature is limited to three adjacent channels, presumably in the lower four

(Continued on page 72)

FORTY–THIRD IN A SERIES

getting started in RC

Index of past parts in this series.

by HOWARD McENTEE

THIS SERIES, which began in August 1967 AAM, was dedicated to the newcomer to RC and was to be written in simple terms he could understand. It occurs to us that even not-too-recent RC beginners may not have seen those earlier parts, which might answer many of their questions. Here's a brief rundown of contents.

Part 1–Aug. 1967: Getting into radio control; where and how to pick up information; planes to begin with.

Part 2–Sept. 1967: Simplest control systems; escapements, sequence servos, pulse proportional control.

Part 3–Oct. 1967: What are encoders, decoders? Servos and actuators?

Part 4–Nov. 1967: Licenses needed for RC operation; Citizens Band and Amateur radio licenses; how to obtain information, license forms; frequencies utilized for radio control.

Part 5–Dec. 1967: Cost of RC; getting started the most inexpensive way (prices given are reasonably accurate for today's market).

Part 6–Jan. 1968: The simpler types of receivers utilized in RC.

Part 7–Feb. 1968: Field etiquette, rules, behaviour; getting along with fellow fliers; transmitter frequency flags.

Part 8–April 1968: All about dry cells; the best types for RC–the most power for the money; cell holders; storage.

Parts 9, 10, 11–May, June, July 1968: Reading simple circuits; circuit symbols; how this knowledge can help the beginner.

Part 12–Aug. 1968: Interference generated inside an RC plane; minimizing trouble from this source; antenna placement on model.

Parts 13, 14–Sept., Oct. 1968: Usage, storage, charging, testing nickel-cadmium cells; getting longest reliable life.

Part 15–Nov. 1968: Installing components in plane; best placement for each system part; protecting them from damage.

Part 16–Dec. 1968: External interference; use of monitors; "swamping"; receiver images; tracing and minimizing interferenc.

Parts 17, 18–Feb., March 1969: Control system nomenclature; what controls may be had with the various types of systems; single-channel and multi system usage tables. Features of pulse and digital systems.

Part 19–April 1969: What's on the market; options and variety in multi-control equipment; transmitter stick variations; equipment kits.

Parts 20, 21–May, July 1969: Simple antenna theory; glitches; antenna loading; reflections; receiver antennas; receiver tuning.

Part 22–Aug. 1969: What to do if equipment quits; simple tests; know when to return it to the maker.

Part 23–Sept. 1969: Applying RC to model boats; types of drive power; equipment protection.

Part 24–Oct. 1969: Test equipment for the RC'er; battery checkers, field strength meters, monitors, multimeters, etc.

Part 25–Nov. 1969: How servos work; spring-centered, feedback, etc.

Part 26–Jan. 1970: How to trim a rudder-only plane; CG location, glide tests, the first power flight, engine thrustline adjustment.

Part 27–Feb. 1970: Simple explanation of digital system operation.

Part 28–March 1970: How a superhet works. (See also Part 32, July 1970, for correction, further superhet information).

Part 29–April 1970: Glossary of RC abbreviations.

Part 30–May 1970: Glossary of RC words and terminology.

Part 31–June 1970: How RC transmitters function: simplest, pulse propo and digital units.

Part 32–July 1970: Further information on RC superhet receivers.

Part 33–Sept. 1970: What can be done with extra controls on multi-digital sytems; brakes, flaps, retract landing gear, bomb drops, etc.

Part 34–Oct. 1970: RC in scale, pylon planes, gliders, sail and power boats, cars.

Part 35–Dec. 1970: Elementary electrical mathematics, making use of Ohm's Law.

Parts 36, 37–Jan., Feb. 1971: All sorts of RC system control linkages; clevises, keepers, flex rods, horns; linear and rotary output servos.

Part 38–April 1971: Suggestions from the pro's; RC manufacturers and hobby shop owners give suggestions on how the beginner in RC should get started, planes to buy.

Part 39–May 1971: RC plane propeller selection, balance, maintenance.

Part 40–June 1971: Operation of digital transmitters–in simplest terms.

Part 41–July 1971: Operation of digital receivers and servos–in simplest terms.

Part 42–Aug. 1971: RC gliders; launching, use of engines, type and placement of RC equipment; best size for beginners to buy.

Part 43–Sept. 1971: Index for Getting Started in RC series.

Since most RC beginners will not have a library of AAM's, contact the publisher for list of back issues available. Many libraries have files of AAM, and so do some hobby shops. The first 19 parts of this series are available in book form for $1.25 (*Vol. I, American Aircraft Modeler Library Series*) from AAM. It is probable that further collections of Getting Started parts will be offered in similar book form in the future.

Many parts of this series have been written in response to queries from readers, others from ideas picked up in conversations with RC'ers–beginners and experts. Why not let us know what you like to see covered in future Getting Started parts?

CARL GOLDBERG

NEW! FOR 1971

Unique *SNAP-LINK!*

Patent Pending

Now for the first time — you can buy a truly safe link — [illegible] SNAP-Link! Note these features:

- Tiny 45° shoulder snaps through arm, prevents accidental opening. So unique it's Patent Pending!
- One-piece design — no separate pieces that might come apart.
- Proven tough nylon molding — takes tremendous stress, prevents metal electrical noise.
- Self-friction fit on threads — no need of a nut to prevent change of adjustment [illegible] vibration wear [illegible] threads.

Snap-Link, Regular, with rod
Mini-Snap-Link, with rod } **. . . 29¢ each**

Snap-Link or Mini-Snap, less rod . . . [illegible] for 40¢

From [illegible] on you can forget those [illegible] nagging link worries. When you want a SAFE link . . . ask for SNAP-LINK!

And More NEW ACCESSORIES . . .

STEERABLE NOSE GEAR

Versatile — steering arm [illegible] to either side, [illegible] slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel — won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat. Try it, you won't get it to strip out easily.

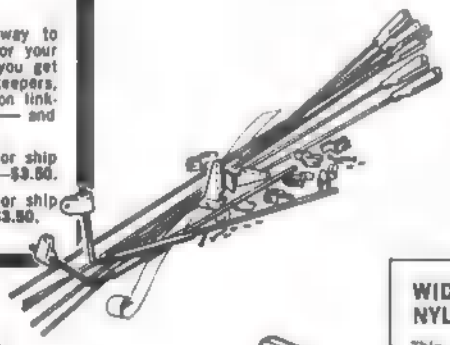
Complete steerable nose gear, with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers—$2.50.

NEW—MAJOR R/C FITTINGS SETS

Here's the economical way to buy the major fittings for your multi ship. In [illegible] set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, [illegible] hinge material — and at a saving.

R/C Fittings Set No. 1 for ship with standard ailerons—$3.50.

R/C Fittings Set No. 2 for ship with strip ailerons—$3.50.

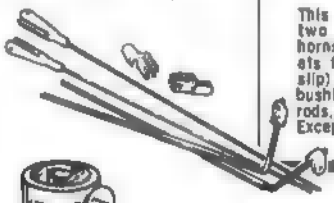


CONTROL [illegible]

Our [illegible] horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 1/16" wire; nut plate for simplest mounting. Long horns or short horns, with screws — 50¢ for 2.

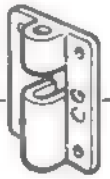
WIDE NYLON TAPE

This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½" wide x 5 ft. — 50¢



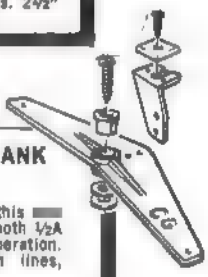
STRIP AILERON LINKAGE

This complete set [illegible] two threaded aileron horns; two nylon brackets for fine, [illegible] (can't slip) adjustment; brass bushings; Snap-Links and rods, and Snap'R [illegible]rs. Exceptional value—$1.50



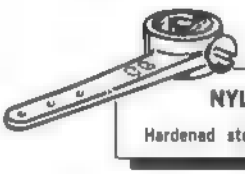
NYLON [illegible]

One-piece design mounts [illegible] firewall without alignment problems. Includes blind nuts, screws and washers — 75¢



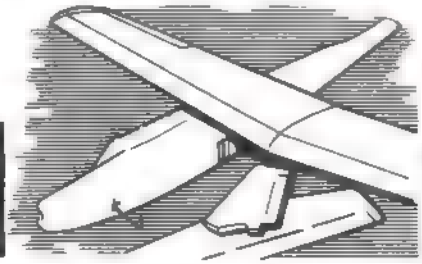
½A BELLCRANK and HORN

[illegible] of nylon, this [illegible] provides smooth ½A control line operation. Easy on dacron lines, too. 25¢.



NYLON STEERING [illegible]

Hardened steel collar and screw — 75¢



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To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly, $3.95. Stab and vertical fin, set $1.95. Assembled Ranger [illegible] fuselage, plus bearers, nosegear, etc., $8.95.

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All our accessories [illegible] available at excellent O.E.M. bulk prices

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11

Eleven facts that prove COVERITE IS BETTER than Silk.

	Coverite	Silk
1. Can be ironed on	Yes	No
2. Can be finished to any color	Yes	Yes
3. Time to cover 60" wing	■ minutes	65.3 minutes
4. Price per yard unfinished	$2.95	$1.50 to $2.25
5. Weight per yard unfinished	1.2 ounces	½ to 1 ounce
6. Unfinished appearance	Semi-gloss, non-porous	Dull, porous
7. Finishing coats needed	3 to 4	10 ■ 15
8. Price per yard to finish	$0.85 to $1.25	$2.50 to $3.75
9. Effect on structural strength of model	Great	Slight
10. Receives decals—all types	Yes	Yes
11. Type of covering	Woven Dacron fabric	Woven Silk fabric

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OCTOBER 1971
MODEL AVIATION
Official magazine
A.M.A. NEWS
Academy of Model Aeronautics · 806 Fifteenth Street N.W. · Washington, DC 20005

INTERESTED IN JOINING A.M.A.? Over 32,000 did in 1970. Membership details may be had by requesting a BROCHURE from above address.

Reviews of National AMA Record Holders

A report of selected recent record holders highlighting the designs and equipment used.

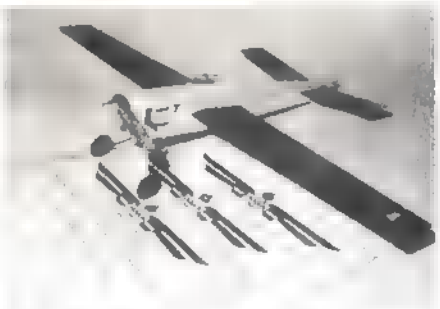
FF C Gas national AMA record, category II, Open age class: 23 minutes, 50.0 seconds, established by Edward E. Aber, Lawndale, Calif., on January 17, 1971.

The airplane is a 34-ounce Starduster 900, about four years old, powered by a Series 67 K & B 40 and Tornado nylon prop, 10" diameter by 4" pitch, and K & B Speed Fuel. Engine run timing was accomplished by a Tatone squeeze-off timer, while Mike cotton clothesline fuse actuated the dethermalizer. The model used a Tatone engine mount and a home-built wedge fuel tank. The center wing panels were double-covered with tissue and then silk, finished with Hobbypoxy over Aero Gloss; the outer panels were tissue-covered, finished with two thin coats of Aero Gloss.

The record was established at Lake Elsinore, an area regarded as sparse for thermal activity. However, Aber says that the air was quite buoyant and very stable at the high altitudes his model was able to reach with near zero-zero trim. The glide was set for a wide turn, about a minute for one circle, to take advantage of the calm air conditions.

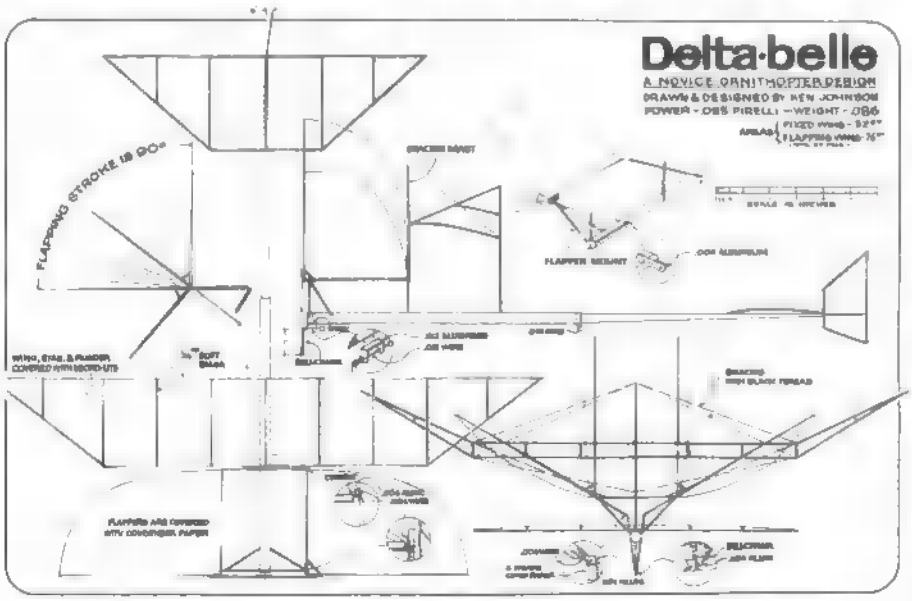
CL 1/2A Proto Speed national AMA record, Senior age class: 92.89 mph, established by James Wade, Anaheim Calif., on January 24, 1971.

Wade's original design model has established many AMA records, indicated by the certificates beneath the model in the photo. The model has a wingspan of 20 3/4" and center chord of 3 5/8". The airfoil begins as a lifting section at the fuselage junction, but it is worked to a symmetrical shape at the



wing tips. The stab, 8" span by 1 15/16" center chord and V-dihedral, has a symmetrical airfoil. Overall length of the fiberglass fuselage by Dale Kirn is 12 1/8". The model weighs 5 1/2 ounces.

The airplane is powered by a Cox TD .049 with high compression plug, left-hand crankshaft, and pressure fitting. Prop, by Dale Kirn, is 4 3/4" diameter by 5" pitch, left-hand fiberglass. Both the pressure fuel tank and fuel of 65% nitro were Wade's own as was the single line torque control unit in the model. Both the wing and stab were covered with MonoKote. The fuselage was finished with Poly-Aqua epoxy marine finish. The 1" streamline wheels were manufactured by K & B.



Indoor Ornithopter national AMA record, AMA ceiling category II, Junior age class: 30.0 seconds, established by Susan Johnson, Reynoldsburg, Ohio, on January 17, 1971.

Susan's Ornithopter was designed by her dad, Ken Johnson. Design details are explained by the accompanying sketches. Micro-X materials were used extensively for the model: balsa wood, Micro-Lite and condenser paper covering and rubber lube. The cement was Testors. Power was supplied by one 12" loop of .080" Pirelli.

PRESIDENT'S MEMO

THE ACADEMY OF MODEL AERONAUTICS IS A VERY PROUD ORGANIZATION!

AMA President John Clemens

The Academy membership has so many reasons to be proud:

PROUD of our acceptance within our communities, as visibly evidenced by the many new modeling facilities being provided by communities. This means that the image of modeling is improving and is being accepted by the public.

PROUD of the many dignified walks of life from which we draw our membership.

PROUD of a newly developed concern among the membership about ways and means of improving our organization still more, and increasing the services received in return.

PROUD of our SAFETY RECORD, as proved by our excellent member and club insurance claims record.

PROUD of our history. Proud of having lifted ourselves from a threadbare and fundless group of enthusiasts into one of the largest, most solidly founded, and wisely run organizations in the entire world, dedicated to the pleasure of its members.

PROUD to be an organization based on the American democratic principles, and in which we are proving that democratic action is practical and can be made to work to the benefit of all.

PROUD to offer the young folks in our communities such a potent outlet for their energies and enthusiasms. In modeling they can learn mechanics, aeronautics, sportsmanship, and the wisdom and rewards of proper conduct.

PROUD that so many quality people actually compete for the privilege of serving on a purely volunteer basis as AMA officers, with their only "salary" being simply the personal satisfaction of having served our neighbors and ourselves.

PROUD that our organization needs the business assistance of only a very small group of paid employees in a Headquarters office. The other responsibilities are thoughtfully shouldered by the several hundred elected and appointed volunteers from among the membership itself the President, the Secretary-Treasurer, the District Vice-Presidents, and Associate Vice-Presidents, the Contest Board members and the members of Special Committees, and the many local area AMA Contest Directors.

PROUD of our ever-improving and accelerating communications, so good that other organizations are beginning to look enviously at us. Proud of the publications and communications coming out of our Headquarters, and especially proud of communications from and between members and AMA chartered clubs, with club newsletters being the most potent vehicle.

PROUD of an outstanding annual National Championship competition, planned and directed, again, by a small group of our most experienced volunteer members, the NATS Executive Committee.

PROUD of the performances of our United States teams in international competition, and especially proud of the enthusiastic support, morally and financially, from our general membership backing these teams.

PROUD ESPECIALLY THIS YEAR to be the host country for the Radio Control Aerobatic World Championships, organized, directed, and sponsored by AMA. This meet to be held about the time this magazine appears, at Doylestown in Pennsylvania.

LASTLY, PROUD that our membership has grown so phenominally this year (expected to be 40,000 by year end), which will give us the means and reasons for entering into many things again next year of which we can be PROUD!

THE ACADEMY OF MODEL AERONAUTICS is an organization of great PRIDE. If you are not already a member you'd better join now and find out why 40,000 fine folks already belong.

John Clemens
AMA President

BILL BOSS

AMA District II Vice-President (New York, New Jersey)

William L. Boss (AMA 19701) was born and has lived his entire 44 years in the New York City area. Bill and his wife, Janet, live in New Hyde Park, Queens, New York. They have two children, Joseph, age 22, and Elinore, age 14.

Bill is serving his employer, American Telephone and Telegraph (Long Lines Dept.) with the title of Staff Supervisor. His work is in network management planning, review and implementation in telephone traffic. This amounts to the setting up of traffic controls for long distance lines for the routing and handling of emergency problems for both the present and future. Bill's education includes a two-year-college Associates Degree in Applied Science, with a major in Electronics and Power. He served two years in the Navy during WW II as Electricians Mate III.

Boss' primary hobby interest is airplane modeling. His secondary hobby interests are photography of both the still and movie variety, which also serve to supplement and complement his modeling efforts. He has been a model builder for 25 years, with 16 of those years having been as an active competition flyer. He placed in the top five in the Control Line Scale event at the '65 and '70 Nationals. He is currently writing a fine column on Control Line Sport and Scale in the "Where The Action Is" section of American Aircraft Modeler magazine. He is always careful that, even though his column sometimes deals in technical matters, it is written with the inexperienced modeler in mind, in nontechnical language.

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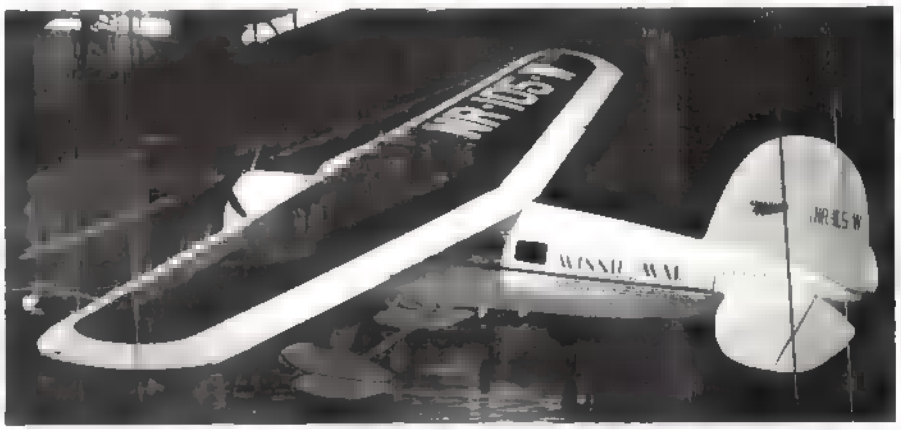

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PRESIDENT'S MEMO

THE ACADEMY OF MODEL AERONAUTICS IS A VERY PROUD ORGANIZATION!

AMA President John Clemens

The Academy membership has so many reasons to be proud:

PROUD of our acceptance within our communities, as visibly evidenced by the many new modeling facilities being provided by communities. This means that the image of modeling is improving and is being accepted by the public.

PROUD of the many dignified walks of life from which we draw our membership.

PROUD of a newly developed concern among the membership about ways and means of improving our organization still more, and increasing the services received in return.

PROUD of our SAFETY RECORD, as proved by our excellent member and club insurance claims record.

PROUD of our history. Proud of having lifted ourselves from a threadbare and fundless group of enthusiasts into one of the largest, most solidly founded, and wisely run organizations in the entire world, dedicated to the pleasure of its members.

PROUD to be an organization based on the American democratic principles, and in which we are proving that democratic action is practical and can be made to work to the benefit of all.

PROUD to offer the young folks in our communities such a potent outlet for their energies and enthusiasms. In modeling they can learn mechanics, aeronautics, sportsmanship, and the wisdom and rewards of proper conduct.

PROUD that so many quality people actually compete for the privilege of serving on a purely volunteer basis as AMA officers, with their only "salary" being simply the personal satisfaction of having served our neighbors and ourselves.

PROUD that our organization needs the business assistance of only a very small group of paid employees in a Headquarters office. The other responsibilities are thoughtfully shouldered by the several hundred elected and appointed volunteers from among the membership itself - the President, the Secretary-Treasurer, the District Vice-Presidents, and Associate Vice-Presidents, the Contest Board members and the members of Special Committees, and the many local area AMA Contest Directors.

PROUD of our ever-improving and accelerating communications, so good that other organizations are beginning to look enviously at us. Proud of the publications and communications coming out of our Headquarters, and especially proud of communications from and between members and AMA chartered clubs, with club newsletters being the most potent vehicle.

PROUD of an outstanding annual National Championship competition, planned and directed, again, by a small group of our most experienced volunteer members, the NATS Executive Committee.

PROUD of the performances of our United States teams in international competition, and especially proud of the enthusiastic support, morally and financially, from our general membership backing these teams.

PROUD ESPECIALLY THIS YEAR to be the host country for the Radio Control Aerobatic World Championships, organized, directed, and sponsored by AMA. This meet to be held about the time this magazine appears, at Doylestown in Pennsylvania.

LASTLY, PROUD that our membership has grown so phenominally this year (expected to be 40,000 by year end), which will give us the means and reasons for entering into many things again next year of which we can be PROUD!

THE ACADEMY OF MODEL AERONAUTICS is an organization of great PRIDE. If you are not already a member you'd better join now and find out why 40,000 fine folks already belong.

John Clemens
AMA President

BILL BOSS

AMA District II Vice-President (New York, New Jersey)

William L. Boss (AMA 19701) was born and has lived his entire 44 years in the New York City area. Bill and his wife, Janet, live in New Hyde Park, Queens, New York. They have two children, Joseph, age 22, and Elinore, age 14.

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Upper Left: Ceremonial ribbon cutting at the opening of Al's Airfield by the MARKS Club, San Bernardino, Calif., participated in by Chuck Comstock, Chuck Beeman and Milt Webb. Left: Maj. Pete Rawlings and Lt. Col. Ed Gill preparing for a piggy-back demonstration during the MARKS Flying Site Dedication. Both photos by Betty Auman. Above Left: Chuck Retay with slightly modified CL Saucer from Jan. 1970 AAM. Richard Woodward of the Lake Erie Gas Model Club says the model is a great trainer and will perform many maneuvers. Above Right: Joe Macay, Southfield, Mich., attaches rubber model prop and front end during spring meet in Canada put on by the Toronto group. Model stand saves need for assistant. Brodersen photo.

either viewed the club's static display booth (which rated a large front page picture in the Dodge City Daily Globe) in the audiotrium or witnessed their flying demonstrations. The club also received a thank you note from Dave Tarter, general chairman for the Chamber of Commerce, who wrote, "the many performances and demonstrations by the High Plains RC Club added many exciting moments for visitors at the Better Living Show, and we sincerely appreciate the time given."

One funny remark heard at the show—while putting up the colored corrugated cardboard to decorate the booth: "Don't let Bill Bailey (HPRC member, AMA 83587) see this stuff; he'll tear it down and build an airplane with it."

V.P.'s and Tail Gunners?

"Some modelers think that appointment to the position of AMA district vice-president is about as significant as being elected tail gunner on a school bus. These people can be only as good as you let them be, so anytime you have a gripe or a constructive criticism write your district VP and let him function." Maybe this comparison by Gene Bradley (AMA 39778) in the Airfoil, newsletter of the AMA chartered Central Kentucky RC Club, seems strange, but his advice is correct and right to the point. This issue contains the complete AMA officer directory; use it!

16th Birthday Solo

On Feb. 3, 1971, Dan Gray (AMA 48867) soloed and flew seven aircraft in three and a half hours. After 2,000 hours of RC flying and 22 hours behind the panels of the "real" ones, Dan, who turned 16 on that day, was ready for this eventful birthday, his abilities proved with seven successful flights. Although he may be a young pilot for full-size aircraft, Dan cannot be considered an inexperienced pilot what with that enormous amount of RC flying under his belt. Thanks to the Santa Paula Chronicle for this information which came to AMA via the Comet's Tale newsletter of AMA chartered Ventura County (Calif.) Comets, RC Section.

STEVE WOOLEY

We are saddened to report the fatal accident in which Steve Wooley, Belpre, Ohio, was involved last May while driving in an auto race. Wooley was serving AMA as U.S. representative to the Control Line Subcommittee of the FAI Committee for International Aeromodeling. Last year he received recognition for superior judging as an official of the CL Stunt World Championships. Wooley was unique in the international aeromodeling picture in that he was one of the youngest FAI officials ever to have served in high positions of responsibility a tribute to his capability and record of performance.

Previously Wooley was a candidate for the office of AMA president and several times member of the U.S. CL Stunt World Championship Team. His presence in the national and international aeromodeling scene will be sorely missed.

Oklahoma Hobby Fair

Acres of open ground for flying demonstrations and related activites plus indoor exhibition areas for modeler and manufacturer displays provide the setting for the third Annual Model Hobby Fair, sponsored by the Oklahoma Science and Arts Foundation. The fair, which for the past two years has successfully drawn crowds of modelers and manufacturers from all over the nation, will be held in the "Women's Building" of the State Fair Grounds in Oklahoma City, October 30 and 31. Besides aircraft models, the exhibition category list this year includes virtually all kinds of modeling.

The fair will be open Saturday night from 12 noon to 9:00 p.m. and on Sunday from 10:00 a.m. to 4:00 p.m. Further information is available by writing Hobby Fair Director Dale Johnson, Oklahoma Science and Arts Foundation, 3000 Pershing Blvd., Fair Park, Oklahoma City, 73107.

Scale Plan Source

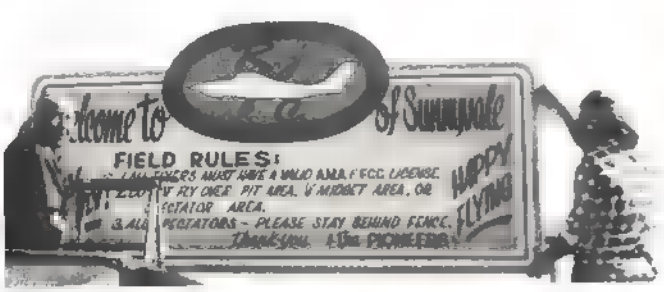
Vought Aeronautics Division of LTV Aerospace Corp. has released an updated model plan of the famous OS2U Kingfisher. The plan (approx. 3/16"=1') is an excellent source for scale model reference. In addition to the plan, LTV has included details and photos of all major models of this scout observation plane. Modelers who wish to obtain this nicely done printed piece should contact: Steve Stibbens, PR Manager, Vought Aeronautics, P.O. Box 5907, Dallas, Tex., 75222. Also obtainable are plans for the F-8 Crusader, F-4U Corsair, A-7D and A-7E Corsair II.

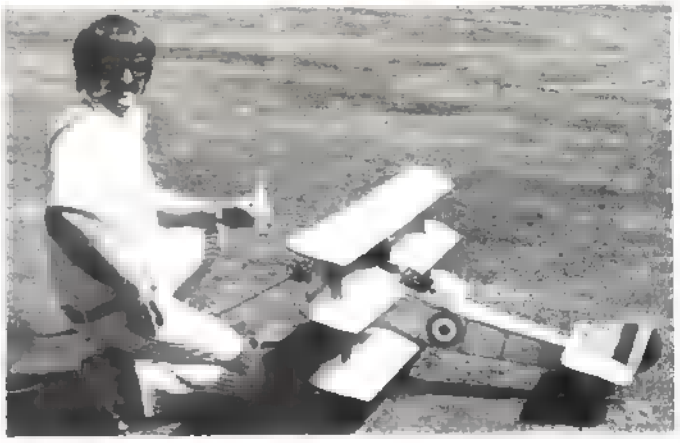
New Flying Site Dedication

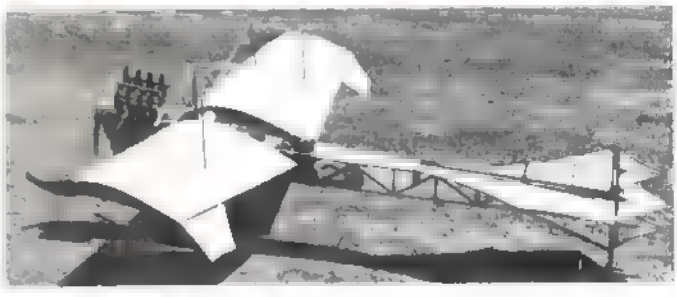
The AMA chartered MARKS club of San Bernardino, Calif., officially dedicated their new RC flying site—Al's Airfield (named after former San Bernardino Mayor Al Ballard and City Councilman Al Guhlm, both of whom were instrumental in securing the lease on the property for the club). Last May the March Hares and the Pomona Vally RC club, two other organized groups in the area, joined the MARKS to celebrate the field's dedication. We congratulate the MARKS club on its good fortune.

Secret to a Successful Meet

The 4th Annual RC Fun Fly Meet sponsored by AMA chartered Wausau (Wisc.) RC Sportsmen, Inc., last June was very successful even though the number of model flyers was not large. But impressive was the







The photos on this page were submitted by the AMA chartered Pioneer RC Club of Sunnyvale, Calif. Top, Above: New flying field sign being erected by Bill Meutzenberg and his son—painted by the latter. Above: Winners in the Pioneer contest for FAI Scale and Stand-Off Scale were Floyd Carter, Bud Phillips, Jim Sunday, Pat Ray, John McRae, Chuck Fuller and Wally Hurley. Upper Right: Wally Hurley with third place Sopwith Tripe, said to be a great flyer. Right: Fabulous Antoinette garnered first place overall for Floyd Carter. Fittings and detail parts were hand made.

turnout of nearly 1000 spectators and the Fun Fly's being operated in such a manner as to result in the Wisconsin Central Airport's offer of their facilities for use in next year's meet.

Kenneth Sparr (AMA 51043), Contest Director of the Wausau club reveals the secret to success: "Advance promotion - keep airplanes in the air at all times--'Blast' the crowd with a P.A. so they can follow the action."

Obviously the extra effort needed to make a meet successful is well worth the time.

Lady Bugs and Modelers

Modelers are constantly being challenged to contend with unusual situations. Contest Director Fred Ginder (AMA 767) in his report of the May AMA sanctioned Fresno Monthly Free Flight Meet explains how ecology is causing some unique effects for modelers: it seems that in order to discontinue insecticide spraying, farmers instead are releasing millions of lady bugs over the fields. Ginder says that although they don't bite - they're annoying!

New Contestant - A Hawk

New contestants are continually being attracted to modeling meets. The most unusual of these was one enthusiastic flyer who, powered by a living motor, insisted on getting in the show during the 5th Annual Texaco Trophy and Dawn Patrol Contest for Old Timer models. This particular flyer, a HAWK! (a real "old-timer"), disqualified himself as he attacked Gene Wallock's (AMA 598) Super Cyclone-powered Nimbus during its first flight by thrusting its talons into the silk covering the elevator and causing some large gashes. The meet, sponsored by AMA chartered Southern California Antique Model Plane Society, proved to modelers that birds will have to realize that they can't be greedy when it comes to sharing air space.

"Red" Retires

John "Red" Hillegas (AMA 387), AMA District III officer some years ago and owner of Red's Hobbycraft Models of Cleveland, Ohio, has retired after 35 years in the hobby business. "Red" was an active AMA worker and Contest Director in the Cleveland area. Also he assisted with many of the National Model Airplane Championships. He was honored by the AMA Executive Council by being named AMA Fellow. He was a charter member of the Hobby Industry Assn. of America. During his association with that organization, he served as a Director on the Board in the Forties and was a chairman of the Dealers Section. We wish him the best of luck.

SPECIAL CL RULING, REVISED INTERPRETATION

NAVY CARRIER LINE SIZE REQUIREMENTS. The Control Line Contest Board has voted by an 8-to-3 margin to institute as soon as possible the provisions of rule-change proposal number CL-71-6 rather than to wait for the normal date of effectivity which would be Jan. 1, 1972. The proposal, which passed its earlier Contest Board Preliminary Vote by an 8-to-1 margin, generally provides for line sizes in the Navy Carrier events which are somewhat of a compromise between those required in 1970 and those specified for 1971 by the AMA president and Control Line Contest Board chairman.

After the proposal had passed its Preliminary Vote, "Doc" Jackson (District II) CLCB member and former CLCB chairman), requested that the board be polled regarding the possible issuance of a Special Ruling by the AMA president and CLCB chairman to make CL-71-6 effective sooner than would be possible following normal Contest Board voting procedures. The board was cautioned as to the possible negative effects of instituting such a change in line sizes so late in the year. Apparently reacting to what seemed to be considerable membership support for the proposal, the CLCB voted for virtual immediate effectivity.

Therefore, acting in accordance with the stated majority opinion of the CLCB, Board Chairman Jean Pailet and AMA President John Clemens have reluctantly, because of the late date and short notice, issued a Special Ruling making the following line sizes in the Navy Carrier events effective commencing with the 1971 National Contest and continuing thereafter:

Single Strand Lines. Carrier I: .026" 1-line, .020" 2-line, .015" 3-line. Carrier II: .033" 1-line, .024" 2-line, .018" 3-line. Profile: .015" 3-line only.

Multi-Strand Lines. Carrier I: .020" 2-line, .015" 3-line. Carrier II: .024" (see note) 2-line, .018" 3-line. Profile: .015" 3-line only. Note: AMA has been advised that .024" multi-strand lines are currently in stock and available by special mail order from at least one line manufacturer.

SAFETY THONG. The Control Line Contest Board has agreed to revise the interpretation regarding pull-testing the Safety Thong in all events requiring their use. The new interpretation, effective immediately, is that the thong may be tested separately from the test of control handle, lines and control mechanism. When the thong is tested separately, it must be pulled to the test weight specified for the particular model involved. The current interpretation also allows the thong to be pull-tested with the entire control mechanism at the option of the entrant.

RC Club Cited for Service to the March of Dimes

By James L. Brown

James Brown (AMA 67555) is president of the AMA chartered St. Paul Model Radio Controllers, Inc. His report details why and how the club participated in a public service activity, explains the rewards, frustrations and expectations for the future.

As president of a club of 70 "grown men playing with toy radio-controlled airplanes" it is difficult to write of the club's recent community service project and remain entirely objective. Thus, this narrative will attempt to tell it "like it was", giving the major facts of the event and the preparations of it.

In the fall of last year the Board of Directors of the St. Paul Model Radio Controllers, Inc., were concerned with: (1) the image of RC in general, (2) the bad public image presented by the west coast newspaper headline fiasco, and (3) the club's own public image. After much debate it was decided to follow the example set by other clubs around the country by putting on an RC display and airshow. However, an additional idea was incorporated into this endeavor. Although the idea for an airshow for profit sounded good, it was instead decided to follow a benevolent philosophy.

The final decision was to contact the local March of Dimes agencies in Minneapolis and St. Paul. Our offer to them was an all day RC display and airshow as an added feature to their annual 2 cents/lb. airplane ride fund-raising project. The Minneapolis chapter has its airlift in the month of May at the Anoka County Airport—an all day Sunday affair. The St. Paul chapter has its airlift in the fall during the month of October. Private pilots volunteer their aircraft and services to the project. Our offer was made cost free to the March of Dimes not only to help draw more people to their airlift but also to help raise additional funds through club activities on the field. The Board of Directors felt this would show the public, on a large scale, what RC is all about by creating a more realistic image of our sport and its members and also be of a direct benefit to the community.

The March of Dimes people responded immediately and eagerly to our proposition. To shorten a long, long story of phone calls, meetings, preparations, club equipment purchases, clearances and innumerable other hurdles to clear, the day arrived.

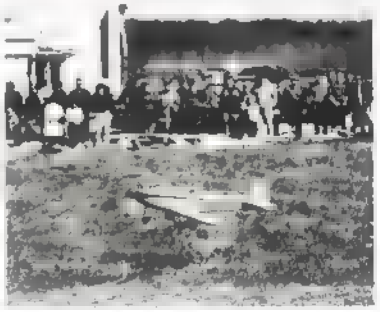
On Sunday May 2 at 8:00 am, the St. Paul RC Club set up a static display of over 100 model RC planes, an operations tent, PA system, and a fund-raising display on a 100-acre field next to the entrance road of the Anoka County Airport. The display and demonstration area was within 100 yards of the loading area for the air rides and next to the parking area. At least 25 to 30 club members were on hand all day wearing green derby hats—with the club emblem attached—answering visitors' questions, manning the fund-raising booth, handing out gliders to the kids, flying demonstrations, and promoting RC and the March of Dimes. Once we had established our basic physical setup it became almost self sustaining. Club members arriving later in the day were able to relieve other members who had already worked for a good amount of time. Good will, public relations, and SAFETY were the functions of the day.

Pattern, Pylon, Scale, WWI bipes, parachute drops, and clown demonstrations were run continuously. A narrative was handled by the club members, via a PA system, to inform the many spectators of what makes RC planes tick. Even the people waiting in line for the airlift could hear and see the RC activities.

For the "fund-raising booth" a newly finished Kwik-Fli was mounted on a field box at a static display booth. The plane's transmitter antenna was collapsed to reduce its signal range. For a small donation to the March of Dimes a person could move the sticks and see just what happens when those "big kids" do it for real. This particular ship was selected because its radio frequency was one not being used by any of the flyers that day. Club members took turns operating the booth, giving explanations to young and old alike. This project raised a surprising amount of money for the March of Dimes.

And then there was the clown act. A pattern ship was left on the takeoff strip while the owner/flyer returned to his car seemingly to pick up some needed tool. In the meantime "our hero" saunters onto the field wearing old greasy overalls and a beat up, greasy baseball cap—worn any direction but forwards. "Our hero," who is "obviously" a mechanic from the hangar area, spots the pretty airplane and the dummy transmitter that had been left behind. The owner, and real pilot, then stationed himself ontop of a truck behind the crowd so that he could be in full command of the plane at all times. Eventually "our hero" fires up the plane's engine and gets chased around the field during "takeoff." The PA announcer informed "our hero" that he had better use the "transmitter" if he didn't want the plane to continue to chase him. Finally "our hero" figures out the controls and gets the plane to do many "maneuvers"!! Even our club members didn't know you can get one of those RC birds to do consecutive loops by bending the antenna into a circle! Neither did they know that inverted flight is accomplished by turning the transmitter upside down and sticking the antenna through

Upper left: Taking [illegible] of the public address duties [illegible] St. Paul RC Club President Jim Brown (left) and club member Al Schwartz (right). Left: Checking the controls and preparing for flight are (L-R) Loren Jacobson, Pete Stapleton, Doug Brueshaber and Greg Broburg. Upper Right: Spectators view the partially finished nine-foot Taylorcraft (foreground) and various other RC aircraft. Right: Dough Brueshaber's plane comes in for landing. Photography by Pat Caine and Don Granlund.



your legs. And how about still flying when the "electronics" fall out of the bottom of the transmitter! Many other demonstrations of "skill" were carried out by "our hero" and his ghost pilot. The final verdict of the "skill" of "our hero" was determined by the spectators; that seemed to be: WOW!

POSTLOG. For its service to the March of Dimes and the community, the St. Paul RC Club was given a Certificate of Appreciation by the national foundation. To this writer's knowledge, this is the first such recognition given to an RC club.

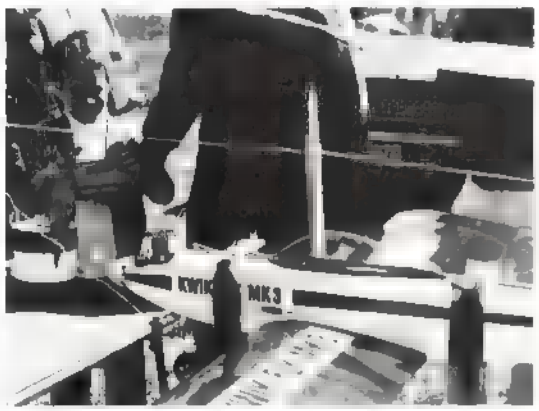
Speaking now strictly as the club's president, I feel that individual members of our club can be very proud of themselves, their club, and RC in general. I've been in a number of organizations of different interests, but have never found a better total rapport than is in the St. Paul RC Club. Because of this I think RC as a whole, as well as our club, gained a point in the eyes of the public.

As a part of our cooperation with the March of Dimes we were afforded publicity in the local suburban newspapers, radio announcements, and a mention on a local aviation television show. We were, however, disappointed with the lack of coverage in the major newspapers of Minneapolis and in lack of TV coverage. The local TV stations covered the airlift operation but failed to bother with our efforts. Even though the TV men had to drive past our display to get to and from the airlift loading area, and although we were advertised as a featured event of the day, our activities were never aired.

Strange as it may seem it is by reason of this lack of coverage that our club will again offer our services to the March of Dimes this fall. (We'll do it for the same fee, again!) Our reasoning is this: we, as an individual RC club, and as members of the RC fraternity, must continually demonstrate our ability to serve ourselves and the community. Eventually, someday, we RC'ers won't have the stigma placed on us of being "grown men playing with toy airplanes." Who knows, maybe our local TV reporters won't drive by an RC demonstration or contest without stopping to see what gives. I feel very strongly that RC is a sophisticated man's sport (and woman's) and that, someday, RC events could be featured on the 6:15 pm sports cast on TV.

From personal experience, as an RC'er, club member, and fortunately this year an RC club president, I feel the public is ready for us. When they are shown the real world of organized RC the public becomes very interested in us.

The key is ORGANIZATION.



Above: Young boy operates the controls of the Qwik-Fli at the fund-raising booth. Right: "Our hero" finally locates the runaway plane.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics.

SEPT. 4-5—MADERA, CALIF. (AA) West Coast RC Championships. Site: Madera County Airport. W. Allen CD, 1410 So. Claremont St., San Mateo, Calif. 94402. Sponsor: Fresno Radio Modelers, Wavemasters, Pioneers, Peninsula Channel Commanders, Vaca Valley RC.

SEPT. 4-5—DALLAS, TEX. (AAA) Southwest Model Airplane FF, CL & RC Championships. Site: Hobby Park & Samuels East. R. Tenny CD, 432 Lynn St., Richardson, Tex. 75080.

SEPT. 12—QUEENS, N.Y. (A) Forest Park M.A.C. CL Fly for Cash. Site: Flushing Meadow Park. F. Howard CD, 91-18 108th St., Richmond Hill, N.Y. 11418.

SEPT. 4-5-6—MEMPHIS, TENN. (AA) Memphis RC Annual-1971 Meet. Site: MRCC Field. K. McClure CD, 3465 Powers, Memphis, Tenn. 38128. Sponsor: Memphis RC Model Club.

SEPT. 4-5-6—ANNVILLE, PENNA. Keystone RC Society Invitational Fun Fly. Site: Indiantown Gap. W. Maidl CD, 5 Berkley St., Middletown, Penna. 17057. Sponsor: Keystone Radio Control Society.

SEPT. 4-5-6—CLEVELAND, OHIO FAI CL Team Finals. Site: Cleveland Model Flying Field. J. Smith CD, 960 Brenner Ave., N.W., Massillon, Ohio 44646.

SEPT. 4-5-6—BRIGHTON, WISC. 1973 North-Central FAI FF Semi-Finals Meet. Site: Bong Field. P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts & Illinois Model Aero Club.

SEPT. 5—PETTYVILLE, W. VA. (A) Vienna Skysharks Annual RC Fun Fly. Site: Vienna Sky Sharks RC Field. S. Sturm CD, 2709 14th Ave., Vienna, W. Va. 26101. Sponsor: Vienna Skysharks Model Airplane Club.

SEPT. 5—CHICAGO, ILL. (AA) I.I.A.A. Annual CL Contest. Site: Forest Preserve, G. Johnson CD, 6260 N. River Rd., Rosemont, Ill. 60018.

SEPT. 5—BUFFALO, N.Y. (A) United Pylon Racing RC Circuit. Site: Buffalo. H. DeBolt CD, 49 Colden Ct., Cheektowaga, N.Y. 14225. Sponsor: Erie County Model Aircraft Assn.

SEPT. 5—NEW CASTLE, PENNA. (A) Skylarks Funtastic RC Meet. Site: P.O.R.K.S. Flying Field. G. Ehnot CD, 415 S. Crescent Dr., Sharon, Penna. 16146. Sponsor: Skylarks of Sharon, Penna.

SEPT. 5—ORANGE, MASS. (A) 17th Annual New England RC Championships Part I. Site: Orange Municipal Airport. C. Piper CD, Highland Rd., Atkinson, N.H. 03811. Sponsor: New England RC Modelers, Inc.

SEPT. 6—MIDDLESEX, N.J. (AA) Middlesex CL Modelers Annual CL Meet.

Continued on page 95

AMA News Extra . . .

FREE FLIGHT WORLD CHAMPIONSHIPS

Wakefield

At third place in Wakefield Rubber, Bob White of Monrovia, Calif., was the top U.S.A. placer in the three events of the 1971 FF World Championships which was held in Gothenburg, Sweden, July 2-5. Wakefield team members John Allen (Albuquerque, N. Mex) and Frank Parmenter (Friendswood, Tex.) place 33rd and 35th respectively. The U.S.A. team placed seventh, Denmark first.

Individual winner was J. Klima of Czechoslovakia whose 232-second 8th round flyoff was the best of the 12 who qualified for the flyoff by logging seven perfect 3-minute flights. White's flyoff was recorded as 214 seconds--with a model whose fuselage was badly damaged earlier from a "blown" motor (but repaired).

New to the Wakefield World Champs this year was North Korea. This state-supported team did exceptionally well for its first WC, having two of its members in the flyoff.

Nordic

Individuals numbering 89 from 32 countries competed in the Nordic glider WC, making it, likely, the biggest modeling WC ever. Czechoslovakian P. Dvorak was the winner in a two-man flyoff between he and N. Munnukka of Finland. The victorious team was Austria.

Hugh Langevin of Minneapolis, Minn. had a flight total short of perfect by only 15 seconds to be placed fifth. Dennis Bronco, Lakewood, Calif., was 17th, and Lee Polansky, Arcadia, Calif., was 24th. The U.S. placed third.

FAI Power

Sweden's Rolf Hagel was the victor in the string of flyoffs which started with 19 men in the 8th round (4-min. max), 12 were in the 9th round (5-min. max), and finished in the 10th round (6-min. max). Hagel's 10th round flight was 5 minutes, 28 seconds. Hagel's Power teammates were also in the flyoff, so that it was a cinch for Sweden to win the Team Championship--flyoffs don't count in team placings.

The top placing by the U.S.--Jim Taylor, Albuquerque, N. Mex., 29th--belies the true abilities of our team members. Taylor was down from the perfect score by only 23 seconds! Buzz Averill, Albuquerque, N. Mex., placed 38th, and Tom Kerr, Philadelphia, Pa., placed 46th--each having missed only one max. The U.S. team placed 13th.

Kerr's miss was a real heartbreaker. His first six rounds were all maxes, and his model seemed to be on its way to the seventh when the mechanical dethermalizer timer malfunctioned and actuated at engine cutoff to bring the model down in just 41 seconds.

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Which officers live in your district? Select correct address when writing officers.

HOW TO USE

Over 150 AMA members serve as volunteers on various committees which determine operating policies of Academy activities—many are listed here. Members are invited to communicate their comments, suggestions, proposals, or complaints by writing to the appropriate committee at any time. Note that the Executive Council and Associate Vice-Presidents represent area interests for general AMA policy matters. Whenever district numbers are shown, write to the nearest address in your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.

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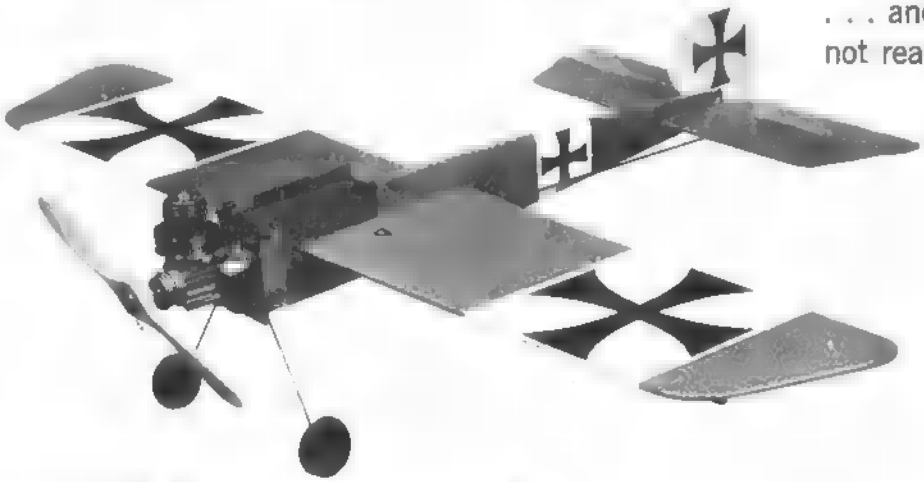

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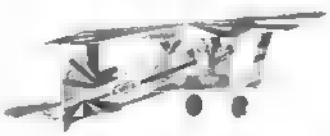

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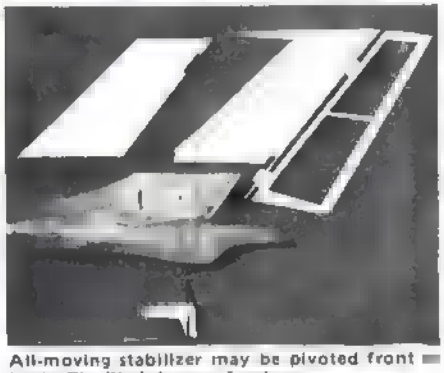
Hi-Pro

(continued from page 21)

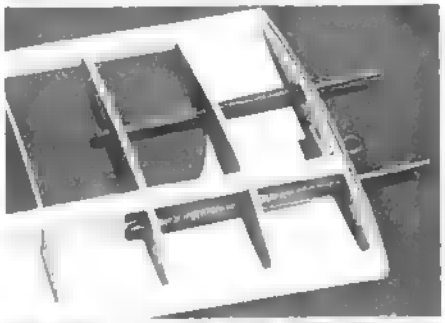
travel. Pushrods and linkages must of course be in before adding upper fin. The big bellcrank will pass through the fuse, so can be first attached to pushrod. Be sure everything moves nicely before final joining.

Several photos of my thermal Hi-Pros are shown to illustrate some different possibilities, other than those the plans show.



All-moving stabilizer may be pivoted front back. Fin fits into rear fuselage.

Here fiberglass rods are not used as spars, but some No. O's are set into panels in ply ribs. These No. O's decline 1/4" in 4". I have 3/16" wire up front, and 1/8" in rear, running into 1/8" ID Nyrod, with everything epoxied together. The protruding wires run into 5/8" sq. bass (pine is fine) blocks jammed and epoxied against 1" by 4" plates of 1/8" ply epoxied against sides internally. No. O rod is set in the blocks. The base for the engine mount is fiberglass, formed right on the fuse after being treated with release agent (polyvinyl alcohol). The upright of ply is secured to base with cloth and resin. I attempted to position it so the mass of the Tatone Tankmount and Cox 09 were at the CG. Blind nuts are set in the rear of the ply firewall. Cheeks are balsa. The protruding wing rods pass thru holes in the base to neatly secure.



This wing hard balsa spars and balsa webbing. Arrow shaft for wire joiners are angled for dihedral in wing.

On the Hi-Tail version the bellcrank pivots 1/8" wire. A length of 1/16" OD brass tubing was soldered to a bit of 1/16" wire, bent into right angle and hooked to bellcrank top rear hole with keeper. Near the top of brass tube, a bit of music wire runs into the tube, soldered into position vertically, with a three-in. crossbar of 1/16" music wire soldered at the top, to plug into the stab halves. One upper fin cheek can be affixed to framework, and this linkage operation finalized before adding other cheek. If you want a low or shoulder wing, fillets could be formed directly on the fuse with epoxy putty.

Scale Techniques

(continued from page 25)

requirements outlined above. Perspective can be created most easily by use of a 28-mm lens (or wider) on the 35-mm camera in place of the normal 50- to 57-mm lens. To stay within the dollar limit, if necessary, go the close-up lens route. This is a handy little attachment which fits to the front of a regular lens and sells for about five dollars for most sizes. Both the wide angle lens and the close-up attachment create the converging lines needed for depth. (How they do this is another story--but the wider the angle of the lens or the stronger the close-up attachment, the more forceful this perspective effect will be.)

Angle? Get down low. Put the model on a table, close to the edge, brace the camera firmly or use a tripod and get in as low and as close as possible. Even a small model will loom impressively when this is done. For the smallest models (1/72 scale or small aircraft), put on a No. 10 (plus 10 diopters) close-up lens or an extention ring on the wide-angle. For larger models, a No. 3 close-up lens is sufficient and cheaper.

Last comes the problem of background. There is only one way I know of to do this. Other techniques just don't work. The background must be a photograph itself and placed as close as possible to the far side of the model.

Making this photograph can be half of the fun. Keep an eye out for a likely site, a deserted field, the local airport, any place where an airplane can be envisioned if it were in full scale. Camera ready, imagine the plane

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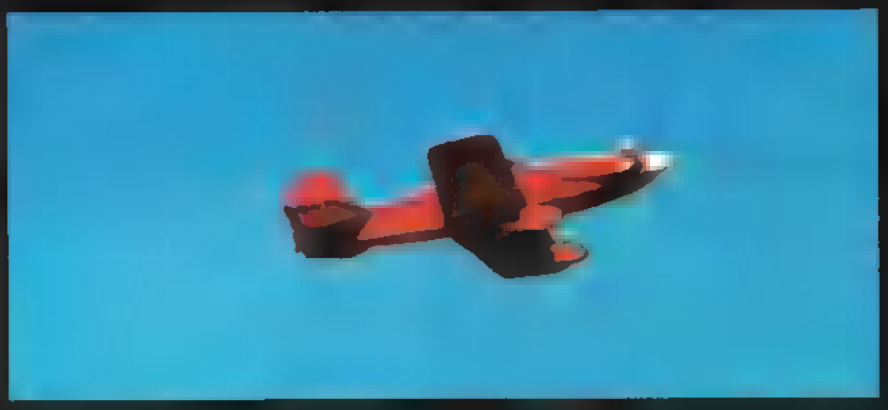

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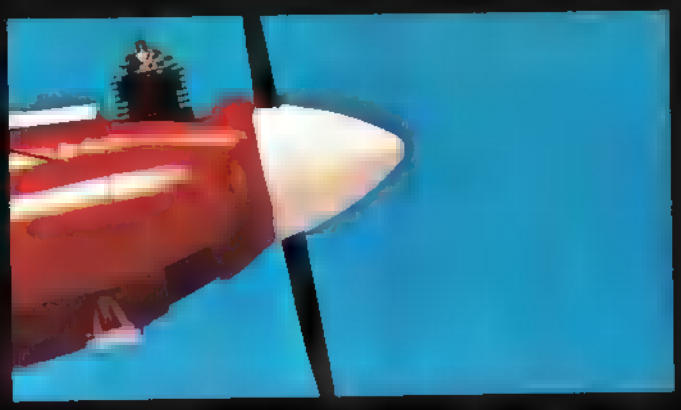

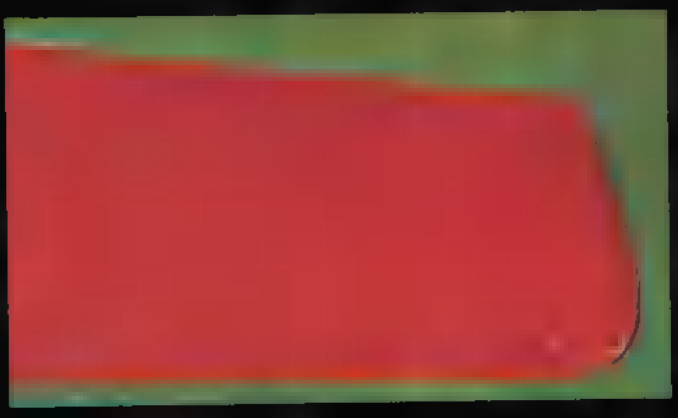

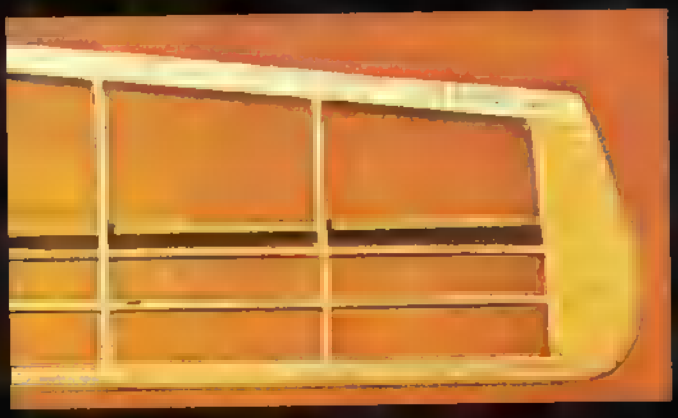

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sitting in front of you. Then snap the picture. Keep the camera level and slightly high as would be done with the real aircraft. The result is a picture of an empty field which can be filled with a model airplane!

For any but the smallest model, a big background is needed. Fortunately, photo posters are "in" and a good 2 x 3' poster can be made for under five dollars (four-footers, if needed that big, also are available for only a few dollars more.) Take the "landscape" shot to a photo dealer or send away directly to the people who advertise in the photo magazines. They may wonder who would want a blow-up of a vacant field, but that is their problem. Models up to nine-in. wingspan can be photographed nicely in front of an 11 x 14" print made by the local drug store.

Mount the print with tape on a backboard so that a part of the foreground rolls forward. This is essential so that there is no broken line between foreground and background. Placement of the horizon is strictly trial and error. Make a few trial views of the model through the camera viewfinder until the horizon bisects the fuselage, then tape the picture down to the backboard. A concrete runway can be simulated by paper tape, dirt by pumice, snow by flour. Construct the foreground directly on the part of the print which rolls forward. From the camera's viewpoint, it will blend into the background realistically. A note of caution: Foreground is difficult to simulate. Don't make the mistake of using real dirt or sand. In most cases, it will photograph boulder-size.

Now to take the picture. Set up a strong light from the same direction the sun was in when the outdoor picture was made. (The reason is obvious!) Use a reflector made of crumpled aluminum foil on the opposite side. This softens the shadows and is essential if they are to be realistic.

Most important of all, stop the lens down as far as it will go—f16, f22, f32 if possible. You'll need all of the "depth of field" you can get. Sharpness and an airplane which is in focus against a background which is also in focus is a characteristic of almost all full-scale shots. It is impossible with most lenses to photograph a real aircraft from 20 feet and not get the background in focus. So overall depth of field is essential for realism.

Then shoot away. Photography may become a real adjunct to model building.

For the reader's information, the biplane shown in the photos is a Halberstadt CL II made from Aurora kit No. 136. It is a 1/4" scale model of a German WW I two-place fighter-attack aircraft.

Incredible Hawk

(continued from page 29)

general clean-up, a better airfoil, and upping the power from the stock 435 hp Curtiss D-12 to a 740 hp Curtiss V-1570 Conqueror engine. Sometime in the summer of 1930, the plan to change airfoils was dropped in favor of eliminating the entire lower wing, thus converting the biplane into a parasol design.

The resulting airplane, despite a rather quick conversion job, was sleek, racy and undoubtedly fast. The original top wing had been retained and covered with skin-type radiators, similar to those on the Curtiss R3C Schneider racer. The cowling also resembled that on the R3C, though the spinner was considerably shorter. The landing gear was especially well faired in, with a modern-looking set of wheel pants. The original tail was kept intact, but about everything else was either new, or at least looked new.

Sitting on the starting line for the first true Thompson Trophy Race, at Curtiss-Reynolds Airport (near Chicago) in 1930, were the Curtiss XF6C-6 and a half-dozen assorted civilian racers—the Travel Air Mystery racers to be flown by Jimmy Haizlip and Frank Hawks; Ben Howard and his tiny 90 hp Pete; Errett Williams in the Cirrus-powered little Wedell Williams We Will Jr.; Paul Adams in a Travel Air Speedwing; and Charles "Speed" Holman in the Laird Solution which had been built in a month and test-hopped only minutes before.

Capt. Page had a clean airplane with almost double the power of any other in the race—the clear favorite. He was first off in the staggered start which allowed 10 sec. between airplanes. By the third of 20 laps around the 5-mi. course, Page had a sizeable lead. With lap speeds between 207 and 219 mph, he had the others completely outclassed. By the 17th lap around the triangular course, he had lapped the entire field.

Then something went wrong. As the Sept. 2, 1930 Chicago Daily News saw it, "...the ship swerved from the course in front of the stands packed with 75,000 spectators, half-circled the field at an altitude of 200 ft. and then dived down, raising a cloud of dust as it burst into fragments."

Capt. Page was still alive when they pulled him from the wreckage, but died in an Evanston, Ill. hospital that night. Investigation proved beyond a reasonable doubt that he had suffered from carbon

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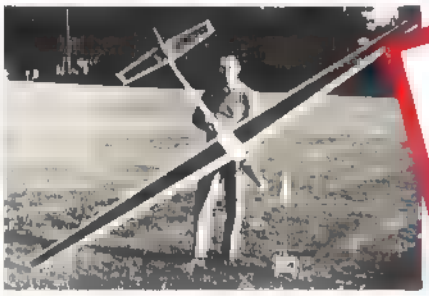

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No. 0701, Gude — Nimble RC for sport or competition. One-piece construction, 40 to engines. Build fast from standard balsa sizes. By Joe Dolan. $4.25

No. 0702, Contender — Military-like RC, also Sport/Stunt type for 35-60. Tri-gear, removable no-dihedral wing. Fast building. By Dave Platt. $4.25 **Special Offer: Get both Gude and Contender plans for only $7.00**

No. 0703, Ironsides — Record-holding CL jet speed model. Metal or wood model shown. Uses Dyna-Jet. By Jerry Thomas. Two plan sheets. $1.25

No. 0704, Cessna AW — Delightful stick and tissue FF great private plane of a indoor or outdoor version possible. Peanut Scale too. $1.50

No. 0691, Winnie Mae — Spectacular RC Vega for strong engine in 2"-1' scale, foam and balsa, lots of details. By Monty Groves. Two big sheets. $4.50

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No. BV-141 B — Asymmetrical WW fighter bomber in profile for 049 engine by Terry Aldrich. Easy to make, good flyer. $2.00

No. 0901, Sorcerer — Pee Wee 02-powered, free-flight flying saucer uses sheet wing, easy to make by Tenderfoot builder. $1.00

No. 0902, Cloud 9 — Intricate contest winning Wakefield by Roger Gregory. Plan shows streamlined prop/hub design. $3.50

No. 0904, Antoinette — Signorino/Zundel RC. 98" wing, nearly scale, flies well on .36, like powered glider. Plans 3 huge detailed sheets. $9.00

No. 0905, Mini Cat — Bud Atkinson scaled down the Cat series, for pulse or light digital and up to 19 engines. Easy to make RC sport flyer. $2.75

No. 0001, Phantom — Well-engineered RC Dyna-Jet-powered scale fighter by Ralph Saldivar is practical but noisy model. Highly detailed plans. Jet installation shown. $4.00

No. 0002, Bobbit — Simplified Nordic Al by Bob Stalick is steady on tow, all-weather flyer. $1.50

No. 0003, Charger — ½A powered sweptwing stunter does full pattern on long lines safely. $2.00

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No. 1102, Aerobile—Large scale CL or RC of a famous Waterman roadable plane. Uses 45-60 motor. Wing detachable, car drivable! Large single-sheet plans. $4.00

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No. 1203, 10-Hi—Six-foot span, 049-powered flying wing is high-performance model with sporting flair. Huge plan. $3.00.

No. 0111, Dragonfli — Fast useful competition stunter by Phil Kraft. Uses big 60's and retracts. $4.00

No. 0112, Toothpick — Long thin winged combat CL ship is both and quick turning. For hot 35's. $2.25

No. 0113, Luton Minor — Delightful 10-powered semi-scale RC for three light servos is high-winged parasol monoplane. $2.25

No. 0211, Cobra—Steve Wooley's great, smooth-flying CL stunt ship for 35's. Light model, ideal for both FAI and AMA patterns. $3.50

No. 0212, Voodoo—Converted Goldberg kit for streamer-towing combat, by Ed Sweeney. Two servos with 19 engine. For event. $2.75

No. 0213, Guillotine—Modified from CL for RC combat. Maneuverable, fast, responsive, and fun. Glides well. For two servos and 19 engine. For new event. $2.75.

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No. 0511, Fire Wagon—Contest free flight model for ½A, by James Clem. Diagonal-ribbed wing resists warps. $1.75

No. 0512, Platypus—Unusual-looking RC aerobatic seaplane, made with balsa-covered foam blocks. Uses ■ $3.00

No. 0513, Troop Glider and Tug—Two models, one a twin-engine, 19-powered C-46 Profile, the other ■ scale CG-15 troop-carrying WW II glider. Both on one large plan. $2.75

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No. 0813, Simple-Fly—Semi-symmetrical CG airfoil low-wing on box fuse. Performance for beginner on 29 ■ novice contest ship with ■ 50. $2.50

No. 0814, Sopwith Pup—Single or multi-channel, nearly-scale model for 10 to 19 power. Highly detailed plans. Stable flyer. $3.50

No. 0815, Santana—Jon Davis' contest-winning towliner A/1. Uses fiberglass boom, stiff warp-resistant wing. $2.00

No. 0711, Phoenix 5—Don Lowe's latest in ■ series of swept-wing competition stunters for 40 and retracts. $3.00

No. 0712, Bonanza/Debonair—Build either V-tail or conventional version of this popular fast flight plane for full-house radio and a strong ■. Fine-flying ships, foam wing construction. $5.00

■. 0713, **I.F.O.**—Would you believe a FF 020-powered flying ■ which really flies? Built-up construction looks real. $1.00

No. 0714, Helldiver—Semi-scale CL model of WW II torpedo bomber ■ fast and is ■ $1.50

No. 0811, Douglas ■iplane—Large FF scale of Western Air Lines M-2 hipe. For 09 power. Could fly with light radio. $3.00

No. 0812, Hot Canary—Unique Formula II/FAI racing biplane by Bob Siegikoff. Although unusual-looking, it is fast and quickly built. $3.25

No. 0813, Pogo—Model of Owl Racer for Formula I features midwing, low stab, non-cheeked cowl. Very stable and plenty fast. By Rob Morse. $3.50.

No. 0814, Flying Fortress—Not a scale plane, but a novelty CL flying medieval castle for a 19. $2.75

No. 0911, Fletcher—McCullough's magnificent tri-geared, low-wing crop duster scale job for 60's. Generous area and moments. All balsa. Highly-detailed plans on 2 sheets. $7.50

No. 0812, Killer—Fast, responsive combat plane. All-balsa for ■ has many wins. $3.00

No. 0913, ACE High—Featherweight 049-powered HO glider uses a set of ACE R/C foam taper and constant chord wing ■ $2.95

No. 0914, Sakitumi—Highly-developed 40-gram Wakefield plane by Brian Donn features latest trends in gadgets and design. Well-detailed plan. $3.00

THIS MONTH'S ■■■■

No. 1011, FAIMan—Competition FAI free flight job for screaming 15's. Simplified construction with warp-preventing wing. Build ■ winner. $2.75

No. 1012, Peregrine—All-out ■■ slope soaring racer for ailerons and elevator. V-tail, laminar wing; aerobatic, too. Balsa fuselage with foam wing. $3.50

No. 1013, Hi-Pro—Highly proficient slope/thermal soarer. Build several versions from these plans. Balsa wing and glass fuselage. $3.50

No. 1015, Marut—Named for the Wind Spirit. Designed for windy weather CL contests. Large-size jet appearance uses 45 engine. Two sheets. $4.50

monoxide poisoning, apparently having inhaled exhaust gas.

Many lessons were learned from the tragic death of Capt. Page, but one that should have been learned ■■ not. His death from CO was repeated in the 1947 Thompson Trophy Race when Tony Janazzo crashed in a big Goodyear F2G Corsair that had burned off several exhaust stacks inside the cowl. That time, however, action was taken; to this day, anyone racing in the Unlimited Class must be on oxygen.

The standard Curtiss Hawk F6C-4 fighter—similar to the F6C-3 which Navy converted to a racer for Page.

With Page's death, the glorious period of service participation in major air races ended. American military airplanes had been as fast as any in the world throughout the 1920's, but this was about to change. Without racing as the spur to ever greater performance, a slump would set in which would force us to enter World War II armed with Brewster Buffalos facing Zeros, and Curtiss P-40's facing Messerschmitt 109's.

But for the civilian pilot, the end of military racing was good news, resulting in one of the most colorful periods in aviation history. It was also the finale for the graceful racing biplane, for the Laird Solution in which "Speed" Holman won that 1930 Thompson race was the last two-winger to capture a major pylon race.

Peregrine

(continued from page 20)

lightweight finish. MonoKote is used, after painting or when MonoKoting, for the aileron hinges.

Additional Notes

Careful attention should be paid to the CG location shown on the plans. The model can be flown with the CG farther aft than shown. However, it will then be too sensitive to elevator control.

The original Peregrine was built using no dihedral in the wing ■ that it could perform aerobatics, particularly inverted flight, smoothly. It is strongly recommended that if the model is to be used for anything else except pure aerobatics, some dihedral (e.g., 2 degrees in each panel) be used.

Pay careful attention to the aileron and elevator throw called out ■ the plans. Do not exceed these throws for the first few flights.

The original Peregrine fuselage had one layer of 4 oz. glass cloth from the trailing edge of the wing and three layers from the nose to the leading edge of the wing. This was done to supply the additional strength needed for landing in high, stiff shrubbery. This additional fiberglassing should not be necessary for areas having smooth, obstacle-free landing sites.

A careful weight summary, kept from the beginning of construction to its final flying weight, showed that the model can be built for an all-up weight under three lbs.

Fiberglassing the entire model can add one lb. of additional weight and may also require additional nose weight due to the added weight of the tail. It should be possible, however, to keep the weight even with the fiberglass finish to about 3 3/4 lbs., if one is careful not to get the tail too heavy.

For the first flights, it is highly recommended to have a helper launch the plane so that you can be ready on the sticks when it becomes airborne. The model is extremely fast and responsive, so handle it gently until you can get it to altitude to feel out the controls. If its past performance is any guide, and racing is in your blood, nothing should be able to touch it. Happy flying.

Blue Ribbon Review

(continued from page 53)

frequencies. (It hardly seems prudent to switch from 72.96 MHz all the way to 75.64 MHz!) The transmitter crystal is quickly reached by removing two thumb screws and the small bottom plate.

The encoder was not changed significantly. A free-running multi-vibrator sets the repetition rate at around 30 frames per sec. Five variable width half-shots provide the five-control input pulses. No attempt is made to adjust frame length with changing pulse widths. Our test set was on the 72.960 MHz frequency (yellow and white). Several stages of oscillator, interstage, and output tuning are provided. (These can only be touched by a holder of a 2nd class FCC license.)

A 9.6 V, 450 mah nickel cadmium battery pack is provided for the transmitter. Total drain was measured at 100 milliamperes; 20 milliamperes less than for the F-700, but at about the same 800 milliwatt RF output power. A charger is built into the transmitter for both the transmitter and receiver packs. It features an isolation transformer to eliminate shock hazard, plus fuse protection. A polarized composite connector for AC input and receiver pack charging is inserted in the single receptacle at the left end of the transmitter. Connection to the airborne pack is made by disconnecting the power harness between the switch and the airborne battery pack.

Receiver design has been changed significantly. It is now housed in a plastic case 1 in. by 1 1/8 in. by 2 1/4 in. A crystal socket is mounted on the receiver board and the crystal can be changed by slipping the lid off the case. One stage of front-end tuning is used; however, sensitivity and selectivity are equal to the excellent level of the F-700. (800 milliwatts of transmitter RF power doesn't hurt either!)

The conventional 455 kHz IF strip and detection, squaring, and amplification of control pulses is performed on the receiver board. These pulses are then passed to the decoder board. The decoder is all new in that it utilizes two National Semiconductor DM9099N Diode-Transistor Logic (DTL), Dual J-K integrated circuit flip-flops for most of the decoding. The pulses from the receiver are used to "clock" the decoder. They are also fed to a pulse stretcher which generates the "hold-off" pulse following the first clock pulse. The operation of such a decoder was described in detail in the review of the Royal Electronic Classic 70 receiver (July 1971

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11"	6-7-7½-8	85¢

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DIAM.	PITCH	PRICE
5¼"	3-4	30¢
6"	3-4	35¢
7"	4-6	50¢
8"	4-6	65¢
9"	4-6-7	85¢
10"	3½-6	85¢
11"	4-6-7-8	$1.00
12"	6	$1.50

POWER PROPS

5¼"	3-4	30¢
6"	3-4	30¢
7"	4-6	40¢
8"	4-5-6	45¢
9"	6-8	50¢
10"	6-8	55¢
11"	4-6-8	65¢
12"	4-5-6-8	70¢

TOP FLITES

DIAM.	PITCH	
6"	3-4-5	30¢
7"	3-4-6	40¢
8"	3½-5-6-8	45¢
9"	4-5-6-7-8	50¢
10"	3½-5-6-8	55¢
11"	4-5-6-7¼-8-8¼	65¢
12"	4-5-6-8	70¢
13"	5½	80¢
14"	4-6	90¢

SPEED PROPS

6"	7-7½-8	60¢
7"	7½-8-9½-10-10½	65¢
8"	7½-8-8½-9	70¢
9"	7-12½-13-13½	75¢
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The Ace High kit features a matched set of foam wings. The constant chord section forms the center, and the taper section forms the outer panels for a graceful, easy to build, strong but flexible, high aspect ratio, wing. This method of construction overcomes the biggest single stumbling block for the beginner to the fine art of soaring. The polyhedral span is 70".

Fuselage and tail assembly is straight forward construction. Balsa and plywood is precision band sawed, and dimension sanded of the highest quality wood available.

Parts for power pod are included (Cox Tee Dee .049 recommended). Those living in the soaring areas of the country can leave off the power pod and locate hooks for high start or tow line launch.

The kit also contains step by step assembly details, matched foam wing sections, hinge material, torque rod and link parts, nylon tubing, and installation hardware for Rudder-Only Pulse Commander. (Standard Commander 10G16 recommended).

Extensively test flown for well over two years.

No. 13L104—Ace High Sailplane Kit $14.75

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Order in the other day from Jim Fosgate, one of the designers of the PRO-LINE Digital series: "Send me complete system; I have to get back in on the FUN of R/C."

And that's the name of the game, isn't it?

Saw a nice 2 channel trainer at Shawnee Mission way. Developed by Ron Jacobson, with some help by Ken Wilson. Uses half of our constant foam wing, and then the two taper sections for dihedralled tips. And you have a beauty of a trainer. Saw an 8 to 11 year old shoot landings. Made a hit at Midwest Contests.

By the way, just to make sure--it flies on R/O Pulse, too.

More on this one later.

Yours sincerely,
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Full step by step instructions to assist in building this gem of a kit. AND ultra simple installation shown for the Commander R/O Baby or Baby Twin!

Span is 34" (cut from the Ace taper wing foam sections), 5½" chord, length is 25 inches. Weight with R/C gear is 12 to 14 ounces.

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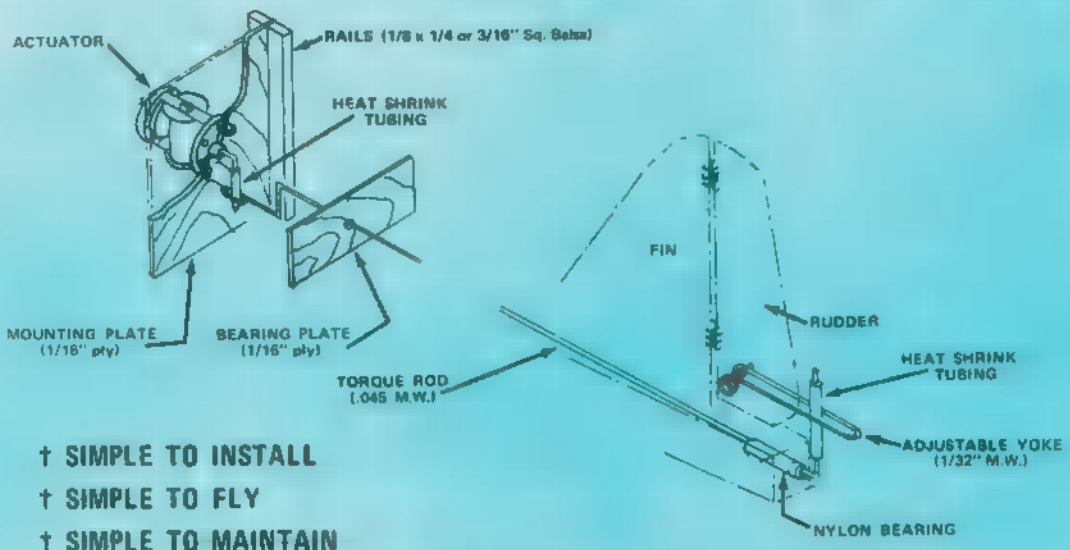

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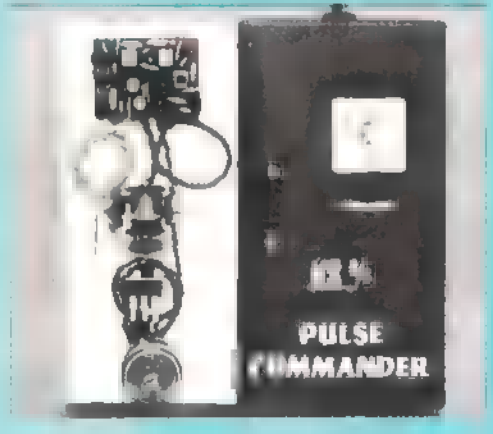

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AAM) and will not be repeated here. Because the IC's contain only four flip-flops, a fifth is required, made up of discrete components for the fifth channel.

All plugs are external to the receiver, with a plug block used as a power junction and for signal output to four of the five output functions. Power is supplied by a separate plug and a separate aileron plug is provided. Wiring to the aileron plug is from the plug block, as is the power plug. All plugs are female at the receiver end, thus there are no bare plug pins to short.

The unique noise-suppression circuit is still incorporated in the airborne unit and involves ■ fifth wire to each servo. This wire connects to the servo feedback circuit via a resistor. The fifth lead from all servos is made common at the plug block and is capacitively coupled to +4.8 V in the receiver. The function is to provide better cancellation of servo noise; it does, in fact, absorb some of the normal stepping of reference voltage during servo movement. However, the receiver is quite sensitive. Because of this and the quickness of the servos, it is mandatory to turn the receiver off before the transmitter and vice versa. As has often been pointed out, this practice should always be followed for any set.

The airborne battery pack is a set of four 450 mah button cells in a pack 1 3/8 in. in diameter by 2 in. long. Capacity is sufficient for about three hours of safe, continuous operation. Plug coding is quite positive and "tangs" are provided ■■ each plug to permit easy disengagement without pulling on the wires.

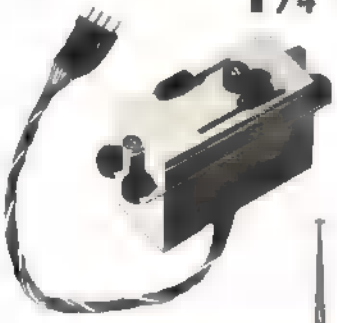
The servos tested were the FP-S2—the same servomechanism tested before. However, a tougher grade of plastic is now used and a Copal motor has replaced the earlier Mitsumi motor. An optional rotary output servomechanism, the FP-S3 may also be obtained. The FP-S2 servo measures 2 1/4-in. long, including mounting lugs, by 1 3/4-in. high, including the output arms, by 27/32-in. wide, and weighs 1.8 oz. per servo. Mounting is by means of end mount lugs and grommets for both servomechanisms.

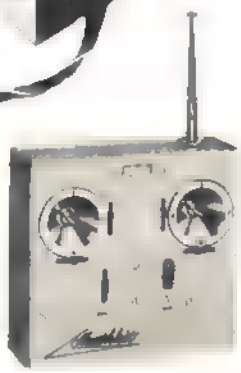
Electronically, the servo design has been improved significantly. Unfortunately, the schematics were not available and the components are liberally potted with a compound similar to Pliobond. Thus, it was not deemed prudent to disassemble the two-deck amplifier to trace the circuitry. Temperature stability is better; the servos were found to exhibit better damping, yet thrust output is nearly doubled at no sacrifice in speed.

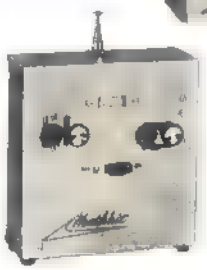
Bench tests showed ■ very consistent servo thrust of four lb., which is excellent for ■ rack output servo. While the manufacturer makes no claim for temperature range, the set was tested from 0 degrees F to 150 degrees F and was found to perform without fault. Servo damping was slightly reduced at the elevated temperature but not enough to be ■ problem. The servo is quite fast with ■■ end-to-end transit time of 0.7 sec.

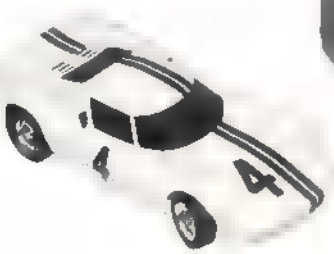
The system was test-flown extensively with excellent results. The set tested compares quite favorably with all sets we have tested. Servo resolution, thrust and speed are outstanding. The sticks are smooth and the transmitter is convenient. Servo amplifier packing in the servo is still a little too tight and extreme caution must be exercised in removal and replacement. All wiring and

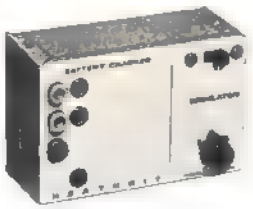
1¼ ounces, 3-pound punch!











New Heathkit Sub-Miniature Digital Proportional Servo utilizes integrated circuit to trim off excess bulk. The Sub-Mini weighs-in at 1.25 oz., measures 1⅞" from mounting to mounting ear, yet provides the same 3-lb. thrust of much larger servos. Features include 90° rotation in 0.5 seconds; 1% position accuracy; ceramic variable control feedback element; nylon gears and molded nylon case. Just 18 components install quickly printed circuit board. Includes 4 rotary outputs, is compatible with all Heath R/C Systems and most others. Measures 1¹³⁄₃₂" H x ²³⁄₃₂" W x 1⅞" L.
Kit GDA-19-42, 1 lb. **24.95***

Heathkit Miniature IC Servo gives you digital circuitry, proportional control, in a package that weighs 30% less, is 25% smaller than conventional servos — but outperforms them with 4 lbs. of thrust. Includes both linear and rotary output assemblies, universal mounting ears. Weighs 1.75 oz., measures 1⅝" H x ⅞" W x 2¹⁷⁄₃₂" L.
Kit GDA-19-41, 1 lb. **24.95***

Heathkit 5-Channel Systems include 4 servos; Heathkit Miniaturized Receiver; Slim Line Transmitter with Kraft sticks, built-in charging circuit; flat-pack nickel cadmium batteries & free soldering iron. Specify frequency desired.
System Kit GD-19S, with Sub-Miniature Servos for 12-oz. flying weight, 11 lbs. **224.95***
System Kit GD-19M, with Miniature IC Servos for 14-oz. flying weight, 11 lbs. **224.95***
System Kit GD-19, with standard servos for 16.6-oz. flying weight, 11 lbs. **199.95***

Low Cost 3-Channel Propo Rig includes 500 mW transmitter with trim controls, miniature receiver, flat-pack batteries, 2 standard servos, plugs, connectors, charging cord, free soldering iron.
System Kit GD-57, specify frequency, 8 lbs. **129.95***

Heathkit R/C Servo Simulator runs from optional internal battery or 120 VAC line. Can be used to charge both receiver and glow plug batteries.
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Heathkit Thumb Tach gives 0-5000, 0-25,000 ranges.
Kit GD-69, lbs. **19.95***

Heathkit "Spectre" Car includes snap-on plastic body, chassis, wheels & tires, fuel tank, R/C equipment box, gears, axles, servo linkages, all hardware, decals.
Kit GD-101, 11 lbs. **39.95***

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assembly is quite professional. Wave soldering is used and [illegible] flux has been removed.

The only suggestion for improvement is one that I suspect is inevitable—the size of the plugs can be reduced slightly. The servo gear-train apparently has a built-in slip protection arrangement which gives at servo thrust in excess of four lb. This does protect the servo amplifier from burnout in the event of jamming; however, I feel that the slip feature might cause a problem in some rare situation of high servo loading.

Construction of the Shell-Fly kit is surprisingly simple due to the amount of prefabrication done at the Pilot factory in Japan. The fuselage is complete and the front end is already fuelproofed. One has only to glue in the stab using the plastic welding fluid supplied, install the motor, and assemble the convenient plastic wing rubber band pegs. The rudder is pre-hinged. Nose wheel is not steerable.

The wings come with strip ailerons mounted. We modified ours for flaps. The fifth channel of the MRC gives us landing flaps for easy operation, on and off a grass field. Wing assembly is a matter of epoxying the halves together and attaching the center section plastic moldings—no fitting or shaping needed.

We also modified the elevator. It was found that the foam elevator was not strong enough and the covering delaminated, so a MonoKoted balsa equivalent was fitted.

All the flying of this plane was done with an old O.S. Max 40. It is still going strong after two years of constant use. In fact, it is rather amazing that the Shell Fly is still alive after two years. Most plastic models would have fatigue-cracked. Not the Shell Fly.

The flying characteristics of the plane are great. It is stuntable, but not for competition purposes. It is light and has a good semisymmetrical wing, [illegible] it is a great sport flyer. Although the MRC radio is not particularly heavy, our installation with five servos in the Shell Fly made the combination rather heavy. The flaps were of great value for safer takeoff from our club's grass runways. We also had coupled flaps available and they gave significantly better performance than without. The point is, our model was heavy—if the Shell Fly were flown with a lightweight four-servo radio, the plane would be that much better. If one of the new O.S. Max 40's were used, performance would become thrilling. Our Shell Fly is [illegible] great sport flyer able to take plenty of rough treatment.

FAI Man

(continued from page 17)

your AMA numbers. Cover stab with tissue and give 5 coats of clear dope. Cut fin from C grain 1/8-in. balsa and tissue cover. Epoxy glue it into the slot in the stab. Set wing and stab aside for [illegible] couple of weeks allowing them to cure while building the fuselage.

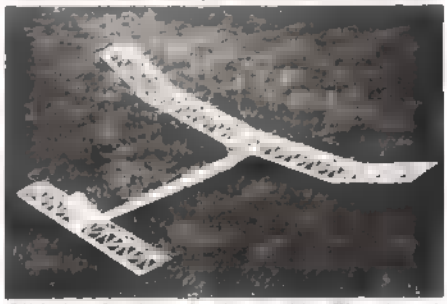
Before beginning the fuselage construction, determine which kind of fuel system to use. I recommend [illegible] pressure system of the modified Perfect No. 6 type, as shown on the plans, in conjunction with a Tatone Flood-Off timer (although the prototype model was flown with a pen-bladder pressure system). The pressure tank system shown on the plans is very much like one detailed in the February/March, 1969 issue of "Free Flight," the NFFS newsletter, and in the VTO column of Model Airplane News (Sept. 1969). If this

tank is used it should be mounted through the firewall, using epoxy cement. The fuselage sides are straight lines. The top is straight from firewall to stab mount cut-out. The bottom is straight to the rear of the pylon and then a straight line angled from there to the fuselage rear.

Cut out fuselage sides from one sheet of 3 x 36 x 3/32 in. medium balsa, and glue 1/8-in. spruce longerons to them. Laminate the firewall as indicated and drill to accept the Tatone landing gear engine mount, which has had around 1/4-in. cut off the top to fit the firewall. Epoxy 4-40 blind nuts into the drilled holes. Laminate the pylon, notching for the fuel tank and noticing that it runs to full fuselage depth.

The balsa fuselage formers (No. 2 on the plan) are now cut out and their location marked on the pylon and fuselage sides. Epoxy the firewall to the front of the fuselage sides, being certain that the firewall is at right angles to them. Epoxy the 1/16-in. plywood front fuselage doublers against the inner face of the fuselage, butting up against the firewall. When dry, glue rear of fuselage together checking to see that there are no unwanted bows or warps. Glue in formers (No. 2) to inner fuselage sides as indicated. After tank is installed, carefully pin and glue to same formers (spreading fuselage slightly to insert pylon) and firewall. Check pylon at this point to see that it is lined up as per plan.

Cut 1/8-in.-sq. spruce to length at stations 3 through 6 and glue into place. Glue in former No. 7; then reglue all joints and fill in around fuel tank and firewall area with hard balsa block and GE silicone calk. Fasten 3/32-in. top and bottom sheeting using Titebond. Add rear plywood stab mounts and



All-balsa fuselage is thoroughly fiberglassed up front. Remember an FAI ship is pretty heavy.

balsa sheeting between the two mounts. Glue in 1/16-in. plywood bearer block at front of fuselage stab mount. Add wing mount and runners, centering carefully. Sand entire fuselage, rounding corners for streamlining. Add gauze and glue around firewall. Install subrudder and epoxy .040 music wire skid to bottom. Cut out timer holes in fuselage—add spruce backing around holes to give some area for the timer mounting screws to bite into.

The fuselage and pylon can now be doped and covered with silk or nylon as is standard practice—or as I do, covering from front to rear with Six fiberglass cloth and polyester resin, which adds tremendous strength and fuel-proofing qualities. If covered with fiberglass, the model should be painted with colored Hobbypoxy for finishing. When fuselage finish is completed, install the timers, fuel lines, DT line, hooks and line guides. Use paper clips to form wire parts. Rubber band the wing and stab into place—pin the stab so that, when viewed from the rear, the fin is offset 1/8-in. to the left of the fuselage center line; then, using 1/4-in. dowels split in half, key the stab front and rear so that when it is tightened down, it always seats with that 1/8-in. left fin offset. Also key the wing so that it rests at exact right angles with the fuselage. To get a good circling glide and a rapid transition from right power pattern to left glide, insert 1/16-in. plywood packing on the left side of the stab platform.

Flying

First flights should be preceded by intensive hand gliding. Launch briskly into any wind, nose aimed slightly down. The model should have a slight left turn with no stalling or diving tendencies. If it does stall or dive, check the center of gravity—it should be no more than 1/8-in. off. If the CG is not as

After years and years of controversy over the so-called beginner problem, but [illegible] action, someone finally is doing something about the situation. On November 1, Potomac Aviation Publications, publishers of the American Aircraft Modeler, will release [illegible] entirely new magazine dedicated entirely to the beginning modeler, whatever his or her age, but focused primarily on the ten- to sixteen-year-old group. A wide range of interesting material and projects, as well as a pioneering, far-ranging policy, should also endear it to the inexperienced sport modeler, and even the expert who wishes to go along for the ride.

All rivers now seem to flow into the sea of radio control which, for the most part, requires a fat wallet, a high order of building and operational skill, comparatively speaking, and handy transportation to distant flying sites.

Most magazines today make a token demonstration to the beginner, but nothing substantial can [illegible] be done by magazines whose life depends [illegible] radio control readers and advertising.

Entitled the JR American MODELER, the new magazine will be a bi-monthly for first six issues, at which point it will [illegible] monthly. First issue is November-December 1971, on sale through subscriptions, hobby shops, and other easy-to-find sources. Price will be 60 cents, a subscription for [illegible] first six-issue year, $3.00. Contents will emphasize model airplane building and flying but will include appropriate boats, cars, and a variety of interesting projects with educational and scientific value. Special attention will be given to [illegible] aspects of how-to-do-it.

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indicated, add weight to front or rear to get correct balance. When correct, any stalling tendencies in the glide can be straightened out by shimming up the front of the stab by slight (1/64-in.) increments; diving tendencies are corrected by shimming up TE of stab in similar increments. Glue shims into place on platforms when satisfied with glide at this stage.

First power flights should begin with short engine runs—with engine at reduced rpms. Launch at a steep angle just slightly to right of wind. The model should climb almost vertically to the right with about 1¼-in. turns in its spiral under full power in ten seconds. If it tries to go left or loop, add a washer or two of right thrust to get it into its right climb pattern. This model is very fast in the climb and grabs phenomenal altitude in ten sec. As this is an FAI power model, its weight should be checked and, if necessary, additional weight added at the CG to bring it up to the required 26½ oz.

The FAIMan has become my favorite design: I hope it becomes yours. So keep it for future contests by always dethermalizing your flights—even those tests on "non-thermal" days.

Marut

(continued from page 36)

with no trouble. You will notice that the front end has a lot of beef to it. This absorbs a lot of the engine vibration, cutting down on stress cracks. In the past, I usually end up adding lead to the nose for balance. This time I thought the weight should do some good, instead of just getting a free ride.

Make a 5½ oz. tank and run the fill lead back to be concealed by the inboard airscoop. The vent line goes straight down and can be turned into a pitot tube arrangement. Coat the tank compartment with fiberglass resin and install the tank system. Add the nose gear setup and fiberglass in place. Add the ¼-in. side planking and strip plank part way up to define the bottom curve. Shape the sides, using a template to make sure the curve is correct.

On a perfectly flat work surface, draw a straight line from the edge long enough to provide a centerline for the fuselage. Place the engine unit on this line, motor mounts directly on the work surface. The protruding

former should rest at the edge of the table and the centerlines should match. Place the false wing section in position aft of the engine section; line it up and secure both units to the table. Remember, you will have to pick it up later. It is very easy to bury the hold-down pins under the construction—this goes for the wing assembly, too.

Cut the bottom keel and all formers. Notice in cutting the formers that the cut line is ½-in. above the centerline in each case except the last two. The last two formers are blocked up by ¼-in. scrap blocks, making it easy to drop in the magnesium exhaust tube later.

Pin the keel and formers in position over the centerline on the table. When perfectly lined up, glue in place. Cut extra pieces of ½-in. block to place on either side of the fuselage between each former. These will help position the first planking strip to be glued on. The top of this strip a130, corresponds to the centerline of the model and is the lowest one to be placed. Planking to the bottom of the formers (bottom in this case, meaning toward the table) will make installation of the flap horns difficult.

All planking is 3/32 x 3/8" and is beveled to fit on the edges. Do not glue the planking to the wing form. Leave a small section of planking over the wing section incomplete to facilitate final mating of the wing and fuselage. (If that section is completed, there is no way to fiberglass the seam later.) Once all the planking is complete, except for the section mentioned above, the fuselage bottom is a rigid, perfectly straight unit with a preformed wing cut-out that will insure accurate line up later. Remove from the table and set aside.

Next step is the wing. Cut the spars and ribs, marking centerlines as you go. Make sure the legs the spars are cut accurately, since these provide the basis for the wing setup. It also helps to the spar line along the top of the legs for ease of removal later. If you do this, put some Scotch Tape over the cut line to hold the legs in place.

Again, mark off a straight line to correspond with the rear spar position. This line should run the full span of the wing—a little extra for good measure. At about the center point of this line, erect perpendicular line to correspond with the fuselage centerline. Glue the spar sections together with a 1/8" ply doubler on the aft face between the slots for the center ribs. Pin the spar upright on the work surface, aligned with your reference line.

The next step to place (not glue) the ribs and front spar in position. Check fit and alignment. Centerline should meet centerline. All rib centerlines should be parallel with the table. (Note that there is a slight taper in the wing thickness.) All of the taper is the bottom of the wing, the spar centerline is higher at the tips than at the center. Once everything is perfectly fitted, glue all ribs outboard of W5 and the center seam of the main spar.

When dry, remove the center ribs and fiberglass the center sections of both spars, front and back, using both cloth and resin. If you omit this step you will have terrible surprise one day when the wing fails. I know from experience--that's what led me to a rush job on the Intruder. Just before the fiberglass is fully set, trim out the excess from the rib notches. It will also a lot of work later if the resin job is done neatly with runs and drips.

While the resin is hardening, form the landing gear wire to fit the platforms and predrill the holes for the hook bolts to be installed later. The plane is designed to sit tail low, minimizing the length of the main gear, yet providing ample clearance for the 12-6 prop to get the plane out of grass. This ground attitude also helps the takeoff smoothness. It is necessary to come in for ■ slow landing, however, to prevent going airborne again. A full-stall landing is the way to land real ones, and there is no reason for making ■ hot landing with a model. If it is fully stalled just at touchdown, full-down elevator will keep it there. Wait until it is on the ground though, before putting in full down.

Although off the subject of construction, you might be interested in how to get ■ full-stall landing. After the engine quits, make a smooth, gradual descent to about ■ foot or less from the ground. The smoother the surface, the lower the descent; best is about six in. Keep it there, slowly feeding in more and more up elevator to maintain altitude. This increases the angle of attack to get more lift at slower speeds, thus generating more drag which slows the plane still more. This means still more up elevator, thus, more drag.

In a few seconds, you will not have more up to feed in and the plane will settle, all flying speed gone. This will result in the main gear hitting first with the nose gear settling down gently soon after. In ■ no-wind situation it is possible to hold the nose gear off for several feet. If you are coming up into the wind ■■ landing, put in full down to hold the plane on the ground. When this type of landing is done properly, you will find few judges who won't give maximum points.

The next stage in construction is to glue the ribs and plywood floors in place, checking for accuracy all along the line. The leading and trailing edges follow. These are made from three-in. wide balsa with the edges dressed so they are all parallel and of equal width. (Check it with a straight edge and ruler.) When the wing is turned over for the bottom planking, these sheets are used to maintain alignment. Glue them in place on the ribs, making sure the bottom edges are in good contact with the table surface.

While they are drying, add fiberglass to the gear platforms and to the bellcrank platform. Remember, you are going to take a 50 lb. pull test on rusty scales. I have been pulled almost 100 lb. at a couple of meets. It does no good to protest the accuracy of the scales once the controls are out of the wings.

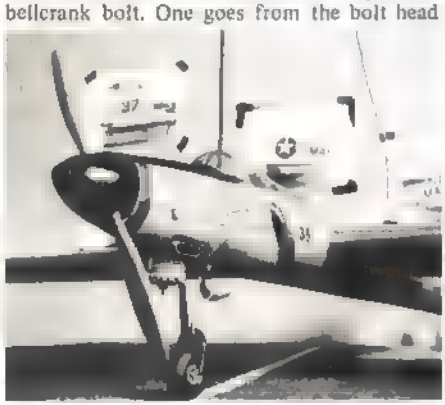
In line with this attitude, I use a steel bellcrank made by Art Adamisin of Detroit, who would probably do the same for you if contacted. (Don't tell him you ■■ going to cut it down to a standard 3-in. size, since he is ■ great believer in 4-in. bellcranks!) You might also try his Y-shaped unit which works well.

Next, add the leading and trailing edge planking—3 in. for the front and 6 in. for the rear. This will leave just the right gap for installation of the gear, lines, etc., and can easily be plugged later with ■ 4-in. sheet. Be sure to bevel the sheets for ■ good fit with the edge planks, leaving no gaps. Allow everything to dry overnight.

Remove the wing from the table and invert it. The wing is realigned with the reference marks and pinned down by the leading and trailing edge planking. There should be no need for any adjustment to

make the wing contact the work surface, provided all work was done carefully in the earlier stages. Remove the jig legs from the spars and plank the bottom in the same manner as the top; let dry.

At this point the wings will maintain a pretty good alignment, so remove the wing from the table and add the control system and landing gear. Out of scrap ply make a brace to take the sheer loads on the top of the bellcrank bolt. One goes from the bolt head



Inverted Veco in well-rounded fuselage could easily be muffled.

to the first inboard rib; another angles from that point to tie into the main spar. Bond with Epoxy. I bushed everything with nylon, including the fairleads in the fuselage. Once everything is in and working smoothly with no binding, replace the wing on the table and recheck alignment. Complete the bottom planking. A little time to make a good fit is good at this point.

When dry, turn over the wing and finish the top planking. Trim the leading and trailing edges to fair into the airfoil. Make sure the leading edge is done carefully to a smooth, rounded shape. The trailing edge is not rounded. The wing, complete with gear, etc., should come in at about 17 oz. at this stage. Do not add the tips until the plane is completely assembled.

The following step is to mate the fuselage with the wing. If everything has been done carefully up to this point, they should drop right into place. Nevertheless, the more care taken at this stage, the better the performance you can expect later. I set everything up on a pool table—as flat a surface as I could find. The main gear was blocked on wedges, which I slid in and out to get perfect alignment with the table surface. After much fiddling and help from whomever I could corral, all centerline measurements were equal, and a large triangle showed 90 degrees between wing and fuselage. Glue was run-in and the kids were banished to other parts of the house while everything dried.

Add the upper former parts and complete the planking. Don't forget to leave a couple of strips of planking off until the controls are in and adjusted. I used Veco's differential flap horns, but you can make up your own if you wish. If you use a split flap horn with clevis pins on each horn plus the elevator, you have three points of adjustment. This is very handy. Prior to completing the planking, I ran some fiberglass and cloth along the fuselage-wing joint.

Make the elevator and stab as accurately as possible by using round toothpicks to reinforce the stab extensions around the elevators. The stab is supported by 1/8" pieces of hard balsa cut to fit the curve of the stab and fuselage. These pieces are glued to

the fuselage in the proper position and allowed to dry completely. Line everything up again on a flat surface. Leaving the wing tips off until this point helps, because you have the tip rib centerline to work with in getting everything parallel to the table. Line up the tab by sanding a little at a time (as needed) from the supports. When set, glue in place and let dry.

Finish the planking, add the rudder and dorsal block. I reinforced the stab-fuselage junction with glass cloth and resin. This might not be necessary, but why take the chance?

Build in fillets and fill all cracks and crevices. Take all the time necessary at this stage, since anything left undone will show up later in the final finish. Sand the whole thing completely.

Finishing is pretty standard. I don't have any special tricks or secrets, but a brief description might help those not too familiar with the process.

Brush three coats of clear over the bare wood, sanding after the third. Cover the wing with SGM paper to prevent seams from pulling at the butt joints. Add two coats of clear over this. I used Sig Super Fill for filler, brushing on two solid coats and sanding completely with 320 used dry. At this stage, mount the elevators and flaps using nylon hinges with steel pins available at hobby shops. Use round toothpicks to anchor them in place. After making sure they are trimmed and sanded to match the surface, brush on two coats of talcum clear. Mix talcum power with clear dope, to a thick brushing consistency and add some silver dope. (Putting the silver in emphasizes every defect.) Sand and refill until there are no marks left. Any major defect can be filled with a thicker mixture of talcum and dope. Spend a couple of days with this step, moving the plane into different lighting situations. You'd be amazed at how many things you can find with the plane in another room—things you'd have missed otherwise.

I sprayed two coats on Sig Silver over the entire plane as a base color; then added a touch of blue to the silver to get the major variation in the wing panels to correspond roughly with the different metals used in a real jet. Red mixed with silver was used in the tip areas to maintain the metallic feeling in the trim color. Do not sand metallic paint.

Once the color is on you can add all the pressure-sensitive lettering your little heart desires. In a moment of wild exuberance, I decided on the ensignia of the Tripartite Evaluation Squadron for the wing. Three days later I had it masked and painted; to heck with all that work in the future.

The whole plane had three coats of SPL 990 sprayed on for a gloss coat which cut about 10 oz. off my normal dope finish. This was wet-sanded with No. 600 paper and rubbed-out to a high gloss.

I have gone on at great length about some items and completely neglected others. For example, I have not discussed the cowling or cockpit details, figuring that if you are going to build a plane of this complexity, you already know about them.

The end result is a large 80 oz. monster that has caused a lot of comment—some favorable. Certainly no one is knocking the appearance of the plane in terms of impressiveness. One thing everyone seems to agree on, is that a heavier plane flies better in the wind. Just let me win all the windy contests. Others can take the calm ones—if they find any.

Baby Biplane

(continued from page 48)

the center rib by 1/8 in. Try this a few times without dope. Trim the tissue for uniform fit. Now proceed with the dope and cover. Touch at the center rib, first observing the required overlay. When dry, trim around the wing structure; it is almost certain that you will have some wrinkles, especially around the center of the wing.

The final step in the assembly of your Baby Biplane begins with gluing the stabilizer incidence shim to the very top rear of the stabilizer mount platform. It may overhang the fuselage sides a bit. This piece provides the angular difference between the wings and stabilizer to make the plane fly.

Glue the rudder to the stabilizer. Remember, tissue-side up on the stabilizer. Rudder must be straight and vertical.

Attach the lower wings to the fuselage by pinning the fuselage to the edge of the work bench as shown. (Be sure to have waxed paper under the wing mounting area. Glue the area of the joint on both sides and mount the wings. Block up the wing tips 7/8 in. each. Let this dry completely. While the wing is drying, glue the stabilizer/rudder assembly to the stabilizer mount. Align it so that the stabilizer is level with the wing.

While this assembly is still drying, glue the windshield and rear cabane strut, and pin the wing front jig in place. After these parts have dried and while the assembly is still in place on the edge of your bench, start mounting the top wing. The wing should sit in place, accurately aligned with the fuselage, bottom wing and stab sitting on the template and rear cabane strut. Adjust wherever necessary to achieve proper alignment, as shown on the plans and in the pictures. Glue the rear cabane strut joint and the front struts; add the interplane struts very carefully—be sure they don't cause any misalignments.

When all joints are dry, make up the loop of 1/8 in. flat rubber for the motor. It should

be an inch longer than the distance from the rear hook to the nose hook. Wash the rubber with a non-detergent soap to remove the preservative, dry and tie the knot. (A simple square knot will do.) When you install the rubber in the plane, locate the knot at the rear hook and attach rubber to propeller hook.

The completed plane must balance levelly when held by two fingers just under the leading edge spar of the bottom wing. If not, add a dab of modeling clay to the nose or tail to achieve balance.

FLYING

Glide test with a gentle, slightly downward launch in calm air. Correct (1) stalling, by warping the elevators down; (2) diving, by warping the elevators up; (3) turning, by warping the rudder right or left as needed. When properly trimmed for initial flights, the glide should be straight ahead and slightly flared to achieve a flat two-point handling.

Wind fifty turns in the motor and launch the same way. The model should fly out in a gentle left turn. If this works smoothly, add more turns with each progressive flight. A pretty left turn under power and gentle left glide should result; add a bit of left rudder, if not.

From here on, it's a matter of your gaining experience in trimming out the model. Be patient—fifteen to twenty second flights can be expected from novice-built Baby Biplanes. However, the Baby Biplane was not intended to be an endurance record breaker. Its lightweight, small and relatively strong construction make it an ideal sport model that will provide many thrilling flights in local park or school gymnasium.

Research Gambit

(continued from page 34)

understandably have strong reservations about letting someone doing research for a "toy model" clamber all over his pride and joy. There are also time elements—publication deadlines, approaching darkness, onrushing hunger pangs, and other not-so-trivial complications.

In the unlikely event that the hapless 3-view artist delivers a perfect drawing to his magazine or book editor, what then? Well, there is the possible distortion factor in the lens of the reproduction camera, errors in computation of reduction, stretching or shrinking of negatives, films, and printing plates. The paper on which the 3-view is ultimately printed is also affected by humidity and temperature.

I'm not defending anyone, but merely offering some explanations to account for things being so garbled. Most contest rules place entirely too much stress on the importance of 3-view drawings, but I suppose the judges have to start somewhere. At any rate, while in the research phase of your next project, try to gather as many drawings as possible. Resign yourself to the fact that changes and corrections will probably need to be made. The danger is that a guy can become so deeply enmeshed in trying to produce the perfect plan, that he may never get around to building the model! Perhaps the best thing to remember is that the perfect model has yet to be constructed (although some come mighty close).

Proof-of-Scale Presentation

Closely related to research, is the compiling of a proof-of-scale presentation. Some modelers make the mistake of trying to round up this information after they have completed their model, and then wonder why they fare so poorly in scale judging points. Logically speaking, one should be thinking in terms of scale proof from the outset of research, especially if serious competition is contemplated.

To understand the importance of presentations, examine the AMA and FAI rules governing static judging. In the AMA rules, for example, a total of 50 possible points are alloted to the scale presentation. Yet, some builders are literally "throwing away" those points by not taking the trouble of providing good judging documentation.

The rules are quite specific, and can serve as guidelines in assembling your presentation. The material should be organized into categories, since it will be judged in that manner. A looseleaf notebook containing transparent plastic sheet protectors will serve the purpose. Often it is possible to select a notebook in a color to match or pleasantly contrast with your model's paint scheme. Don't be afraid to exercize a little showmanship in this regard! Consider the psychological effect upon the judges of a handsome vinyl-covered binder, as compared with a shoddy oil-stained 3-view ripped out of a magazine!

Verify everything possible for the judges, and be sure to include a brief written summary of the model's important features. In the case of copied information, it is important to give credit to the source. Too much material can be overpowering to judges. While some of them may be impressed by sheer volume, others will be likely to skip

over it, and not afford it proper consideration. Therefore, be selective, and edit out any superfluous items.

Research Summary

(1) Regard all drawings with caution, regardless of source. Consider 3-views as a point of departure only. Some have been based on earlier 3-views from other sources, and contain compounded errors.

(2) Obtain [redacted] many photographs of the subject as possible. Beware of distortions caused by camera angles, odd lighting conditions, and, especially retouching. Altogether too many photos have been altered to change markings, etc.

(3) There can be no substitute for seeing the prototype in person, if it still exists. If the subject is located too far away to visit, try to contact another enthusiast who lives in the area. He will know the type of info you need, and perhaps you can repay his efforts by conducting a little research for him [redacted] day.

(4) Always include return postage when corresponding.

(5) When measuring aircraft for research purposes, expect to make at least two trips to the site. Take photos and measurements during the first visit, return home to make preliminary drawings, then return to correct errors made the first time.

(6) When shooting reference photographs, try to include a scale of some sort in each picture.

(7) For a complete set of both AMA and FAI scale rules, consult a copy of "Model Aircraft Regulations," available for 50 cents from the Academy of Model Aeronautics, 806 Fifteenth Street, N.W., Washington, D.C. 20005.

(8) Allow at least twice as long as you think the job will require. Scale research can soak up time to an alarming degree! Remember the Parkinson law: "Work expands to fill the time available for it."

Periodicals

This list is by no means complete. Publications in the aviation field are constantly appearing and (regretfully) a few are disappearing; others appear on an irregular basis, or are not readily available. Doubtless there are others of which we are not aware. Editors of such items are invited to inform us in order that their publications may be included in future lists.

American Aircraft Modeler
733 15th St. N. W.
Washington, D. C. 20005

Aeromodeler
Model & Allied Publications Ltd.
13-35 Bridge St.
Hemel Hempstead, Herts.
England

Air Classics
Challenge Publications, Inc.
7805 Deering Ave.
Canoga Park, Calif. 91304

Air Progress
The Conde Nast Publications Inc.
420 Lexington Ave.
New York, N. Y. 10017

Airspace Model
OLR Publishing Co., Inc.
615 Ridge Rd.
North Arlington, N. J. 07032

Flying Models
Model Craftsman Publishing Corp.
31 Arch St.
Ramsey, N. J. 07446

Le Modele Reduit D'Avion
74, rue Bonaparte (Place Saint-Sulpice)
Paris (6) France

Model Airplane News
1 North Broadway
White Plains, N. Y. 10601

Model Rocketry
Model Rocketry, Inc.
595 Massachusetts Ave.
Cambridge, Mass. 02139

Plane ■ Pilot
Werner & Werner Corp.
P.O. Box 1136
Santa Monica, Calif. 90406

Popular Rotorcraft Flying
P.O. Box 2772
Raleigh, N. C. 27602

Radio Control Models and Electronics
Model ■ Allied Publications Ltd.
13-35 Bridge St.
Hemel Hempstead, Herts.
England

R/C Modeler
R/C Modeler Corp.
171 W. Sierra Madre Blvd.
Sierra Madre, Calif. 91024

Scale Models
Model & Allied Publications Ltd.
13-35 Bridge St.
Hemel Hempstead, Herts.
England

Soaring
The Soaring Society of America, Inc.
P.O. Box 66071
Los Angeles, Calif. 90066

Sport Aircraft (Air Progress Special)
The Conde Nast Publications, Inc.
420 Lexington Ave.
New York, N. Y. 10017

(continued on page 92)

ON THE SCENE

Continued from page [illegible]

(6)

(7)

(8)

(9)

(5) Tom White [illegible] his magnificent [illegible] for the cameraman.

(7) Scratch-built SE-5 and Dr1 [illegible] Mike Moses of the [illegible] Club. Powered by 19's.

(8) Script rehearsal and review.

(9) Gwen and Jim admire the MonoKote on Pat Murphy's Monterey.

by PAT MURPHY and ED SWEENEY

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To the many people who subscribed to the Jr. American MODELER in advance: Your first issue will be mailed prior to Nov. 1, when this magazine appears in hobby shops. ■ bi-monthly, it will appear Nov-Dec 1971; Jan-Feb, Mar-April, May-June, July-Aug, Sept-Oct, in 1972—and on the first of each month thereafter. Your $3 subscription entitles you to six issues. Subscriptions at $6 will be taken for 12 issues.

(continued from page 90)

Sport Aviation
Experimental Aircraft Assn.
P.O. Box 229
Hales Corners, Wis. 53130

Sport Flying
Challenge Publications, Inc.
7805 Deering Ave.
Canoga Park, Calif. 91304

Organizations

Academy of Model Aeronautics
■ 15th St. N. W.
Washington, D. C. 20005

Antique Airplane Association
Route 5
Industrial Airport
Ottumwa, Iowa 52501

American Aviation Historical Society
P.O. Box 99
Redondo Beach, Calif. 90277

Cross ■ Cockade
(The Society of World War I Aero Historians)
10443 So. Memphis Ave.
Whittier, Calif. 90604

Experimental Aircraft Association, Inc.
P.O. Box 229
Hales Corners, Wis. 53132

International Plastic Modelers Society
3813 Durango Dr.
Dallas, Tex. 75220

North American Rockwell Flightmasters
1932 Conejo La.
Fullerton, Calif. 92633

Popular Flying Association
2 Waldens Park Rd.
Horsell, Woking, Surrey
England

Popular Rotorcraft Association
P.O. Box 2772
Raleigh, N. C. 27602

Soaring Society of America, Inc.
P.O. Box 66071
Los Angeles, Calif. 90066

Wingfoot Lighter-Than-Air Society
1210 Massillon Rd.
Akron, Ohio

Commercial Plan and Scale Drawing Sources

Aerotec Model Engineering Co.
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Harrison, N. Y. 10528

Aeromodeller Plans Service
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Hemel Hempstead, Herts.
England

Aviation Magazines
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John W. Caler Publications Corp.
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Sun Valley, Calif. 91352

W. C. Hannan, Graphics
P.O. Box A
Escondido, Calif. 92025

Historical Aviation Album
P.O. Box 33
Temple City, Calif. 91781

Hobby Helpers
1543 Stillwell Ave.
Bronx, N. Y. 10461

Hobby House Plans Service
16291 Normandy La.
Huntington Beach, Calif. 92647

Bob Holman Plans
P.O. Box 741
San Bernardino, Calif. 92402

Tony Lucca
P.O. Box 319
Deer Park, N. Y. 11729

Model Airplane News
1 North Broadway
White Plains, N. Y. 10601

Modernistic Models
4322 Bellingham
Studio City, Calif. 91604

John Pond Oldtimer Plans
Russcraft Hobbies
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San Marcos, Calif. 92025

Raceplanes by R. S. Hirsch
8439 Dale St.
Buena Park, Calif. 90620

Sudden Service Plans
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Washington, D. C. 20005

Aircraft Museums

(For a more comprehensive listing of museums and other locations of aircraft, consult **Museum and Display Aircraft of the World**, published by the American Aviation Historical Society, P.O. Box 45-435, Los Angeles, Calif. 90045)

U.S.A.:

Air Force Museum
Wright-Patterson Air Force Base
Dayton, Ohio

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Museum of Science and Industry
57th and Lake Shore Dr.
Chicago, Ill. 60637

Naval Aviation Museum
U.S. Naval Air Station
Pensacola, Fla. 32508

Ontario Air Museum
Ontario International Airport
Ontario, Calif.

Cole Palen Collection
Old Rhinebeck Aerodrome
Rhinebeck, N. Y.

San Diego Aerospace Museum
Balboa Park
San Diego, Calif.

Smithsonian Institution
National Air and Space Museum
Washington, D. C. 20560

Tallmantz Aviation, Inc.
"Movieland of the Air"
Orange County Airport
Santa Ana, Calif.

ENGLAND:

The Imperial War Museum
Lambeth Rd.
London S.E.1, England

AMA Contest Calendar
(continued from page 63)

Site: Mountain View Park. S. Shaw CD, 2200 Woodbridge Ave., Edison, N.J. 08817. Sponsor: Middlesex Modelers.

SEPT. 11-12—FORT WAYNE, IND. (AA) Flying Circuits 16th Annual Mid-State RC Contest. Site: Smith Airport. P. Gieseking CD, 1212 Delta Blvd., Fort Wayne, Ind. 46805. Sponsor: Fort Wayne Flying Circuits.

SEPT. 11-12—FISKDALE, MASS. 6th Annual New England Hydro Radio Plane Championships. Site: Brimfield Dam. J. Ross CD, 19 Sterling Dr., Dover, Mass. 02030. Sponsor: New England Radio Control Modelers, Inc.

SEPT. 11-12—ATLANTA, GA. (AA) Atlanta RC Pylon Races. Site: Club Flying Site. H. Coleson CD, 3360 St. John Dr., East Point, Ga. 30344. Sponsor: Atlanta Radio Control Club.

SEPT. 11-12—RHINEBECK, N.Y. (AA) World War I RC Jamboree. Site: Old Rhinebeck Aerodrome. G. Buso CD, 11 Maple Ln., Hyde Park, N.Y. 12538. Sponsor: Mid-Hudson RC Society.

SEPT. 11-12—DAYTON, OH (AAA) Dayton Buzzin' Buzzards CL Jamboree. Site: Municipal Flying Circles. J. Martin CD, 851 Aberdeen, Dayton, Ohio 45419. Sponsor: Dayton Buzzin' Buzzards.

SEPT. 12—FORT WORTH, TEXAS (A) RC Pattern A, B, C, CX Meet. Site: Fort Worth. B. Lutker CD, 6029 Walraven, Fort Worth, Tex. 76133.

SEPT. 12—NORFOLK, VA. (AA) Norfolk Aeromodelers Annual CL Meet. Site: Industrial Park. Capt. J. Klause CD, USN, COMFAIRESWINGLANT, SP-65, NAS Norfolk, Va. 23511. Sponsor: Norfolk Aeromodelers.

SEPT. 12—CHAGRIN FALLS, OHIO Second Annual Midwest Scale FF Meet. Site: Savage Road. L. Reichel CD, 3301 Cindy Ln., Erie, Pa. 16506. Sponsor: Erie Model Aircraft Assn.

SEPT. 12—FELTON, DELA. (A) East Coast Soaring RC Championships. Site: Killen Recreation Area. B. Gottorf CD, P.O. Box 336, Dover, Dela. 19901. Sponsor: Dover Mosquitoes RC Club.

SEPT. 12—DENVER, COLO. Old Timer Fun Fly. Site: E. Colfax Airpark. T. Dannels CD, 1265 Yates St., Denver, Colo. 80204. Sponsor: Model Museum Flying Club.

SEPT. 12—RAPID CITY, S.D. Propbusters 3rd Annual Fun-Fly. Site: Propbusters Flying Site. J. Sallis CD, 243 E. Nevada Dr., Rapid City, S.D. 57701. Sponsor: Rapid City Propbusters RC Club.

SEPT. 12—ALLIANCE, OHIO (AA) Carnation City 1st Annual RC Pattern Meet. Site: Barber's Airport. G. Villard CD, 3301 23rd, N.W., Canton, Ohio 44708. Sponsor: Alliance Balsa Bees.

SEPT. 12—BRIGHTON, WISC. (AA) 28th Annual Midwestern States FF Championships. Site: Bong Field. P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

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SEPT. 12—RIVERDALE, ILL. (AA) Chicago Model Masters Annual CL Meet. Site: Kickapoo 144th ■ Halsted. W. Webb CD, 15722 Vine Ave., Harvey, Ill. 60426. Sponsor: Chicago Model Masters.

SEPT. 15-19—DOYLESTOWN, PENNA. (AAAA) Seventh World RC Aerobatic RC Championships. Site: Central Bucks County Airport. M. Hill CD, c/o AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005.

SEPT. 19—HASTINGS, MINN. (A) 11th Annual FAI Little FF Internats (Cat.II). Site: Webers Air Strip. L. Stockstad CD, 2648 Carlson Dr., Coon Rapids, Minn. 55433. Sponsor: Minneapolis Model Aero Club.

SEPT. 19—MUSCATINE, IOWA (AA) M.M.A.C. 2nd Annual CL Meet. Site: Muscatine Airport. F. Brewer CD, 706 Walnut, Muscatine, Iowa 52761. Sponsor: Muscatine Model Airplane Club.

SEPT. 19—ALBANY, ORE. (A) Northwest Old Timer FF Championships. Site: Parker Field. J. Shafer CD, P.O. Box 322, Dallas, Ore. 97338. Sponsor: Willamette Modelers Club, Inc.

SEPT. 19—VAN NUYS, CALIF. (B) San Valeers Small Field FF Meet (Cat. II). Site: Sepulveda Basin. L. Polansky CD, 865 W. Huntington-1, Arcadia, Calif. 91006. Sponsor: San Valeers.

SEPT. 19—THREE RIVERS, MICH. (AA) 1971 Grimes Modern FF Meet. Site: Three Rivers. W. Cain CD, 4326 Kennilworth SE, Grand Rapids, Mich. 49506. Sponsor: GRIMES.

SEPT. 25-26—AMARILLO, TEX. (AA) ARKS 11th Annual RC Contest. Site: Amarillo. B. Irwin CD, 3302 Lewis Ln., Amarillo, Tex. 79109. Sponsor: Amarillo Radio Kontrol Society.

SEPT. 25-26—NEAR KERMAN, CALIF. (AA) Fresno's 31st Annual FF Gas Meet. Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: Fresno Gas Model Club.

SEPT. 25-26—DENVER, COLO. (AA) 6th Annual Rocky Mountain FF Championships. Site: E. Colfax Air Park. B. Schliem CD, 8984 W. Warren Dr., Lakewood, Colo. 80227. Sponsor: Magnificent Mountain Men.

SEPT. 25-26—W. SUFFIELD, MASS. (AA) NorEast RC Air Races '71. Site: Peterson Farms. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Connecticut Radio Control Club, Inc.

SEPT. 26—FLUSHING, N.Y. (AA) Assn. of M.A.C. of Greater N.Y. CL Meet. Site: Flushing Meadow Park. J. Condon, Sr., CD, 8909 247th St., Bellrose, N.Y. 11426.

SEPT. 26—QUEENS, N.Y. (A) Eastern States Second Annual RC Championships. Site: Rils Park. J. D'Amico CD, 9224 Rost Pl., Brooklyn, N.Y. 11236. Sponsor: Penn. Ave. RC Society, Inc.

SEPT. 26—ST. CLARSVILLE, OHIO RC Fun-Fly. Site: Alderman Airport. A. Grimes CD, 115 Glenwood Rd., Wheeling, W. Va. 26003. Sponsor: Hill-Hoppers Model Club.

SEPT. 26—BRIGHTON, WISC. (AA) 9th Chicago Aeronuts Fall Old Timers' FF Contest. Site: Bong Field. P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

SEPT. 26—OHIO CITY, OHIO (B) SHOO Flyers RC Club Contest. Site: Club Field. D. Kraner CD, RR 1, Ohio City, Ohio 45874. Sponsor: SHOO FLYERS MAC, INC.

SEPT. 26—FT. WORTH, TEX. Cowtown Circleburners Annual CL Rinky Dink No. 2. Site: Borz Model Air Field. B.F. Davis CD, 1613 Carl, Ft. Worth, Tex. 76103. Sponsor: Cowtown Circleburners M.A.C.

OCT. 2-3—VAN NUYS, CALIF. (AA) 22nd Annual FF, CL & RC Scale Contest. Site: Van Nuys (Basin). C. Hatrak CD, 3825 W. 144th St., Hawthorne, Calif. 90205. Sponsor: N.A.R. Flightmasters.

OCT. 2-3—ROCHESTER, N.Y. (A) United Pylon Racing Circuit RC Championships. Site: Rochester. R. Walder CD, 129 Westmoreland, Rochester, N.Y. 14620. Sponsor: Radio Control Club of Rochester.

OCT. 2-3—OCALA, FLA. (AAA) Hurricane FF & CL Meet for Cat: II. Site: Dunnellon Airport. J. Krutz CD, 76 Kenilworth Ave., Ormond Beach, Fla. 32074.

OCT. 3—ROWLEY, MASS. 1971 Cape Ann Fly-For-Fun Meet. Site: Cape Ann RC Site. R. Gaertner CD, 9 Brookbridge Rd., Peabody, Mass. 01960. Sponsor: Cape Ann RC Model Club.

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OCT. 3—DAYTON, OHIO (AA) Cold Cash Bash CL Meet. Site: Municipal Model Airport. H. Roe CD, 165 Broadripple Rd., Centerville, Ohio 45459. Sponsor: Dayton Buzzin' Buzzards.

OCT. 3—DETROIT, MICH. (AA) Great Lake Fall CL Internats. Site: Rouge Park. J. Lucas CD, 20463 Ardmore, Detroit, Mich. 48235. Sponsor: Strathmoor Model Club.

OCT. 3—LAKEHURST, N.J. (AA) Central Jersey RC Club Eastern States RC Meet. Site: Lakehurst N.A.S. L. Shulman CD, 42 Blake Ave., Cranford, N.J. 07016. Sponsor: Central Jersey RC Club.

OCT. 3—MANSASSAS, VA. (AA) Maxecuters Fall FF Meet. Site: Mansassas. J. Thornhill CD, Box 85A, RFD No. 1, Mt. Airy, Md. 21771. Sponsor: D.C. Maxecuters.

OCT. 3—MENTOR, OHIO Quarter Midget RC Third World Championships. Site: MARCS Field, Tyler Blvd. R. Penko CD, 21151 Westport Ave., Euclid, Ohio 44123.

OCT. 3—VAN NUYS, CALIF. (AA) Valley Circle Burners Oct. CL Meet. Site: L.A. Model Airport. W. Cohen CD, 7323 Amestoy Ave., Van Nuys, Calif. 91406.

OCT. 3—BONG FIELD, WISC. (B) Pelican Annual N.I.A.M.A.C. FF Meet For Cat. II. Site: Bong Field. R. Elman CD, 17707 Burnham, Lansing, Ill. 60438. Sponsor: Pelican Model Airplane Club.

OCT. 9-10—LAS VEGAS, NEV. (AA) L.V.R.C. Annual RC Meet. Site: Mint Gun Club. G. Horstman CD, 613 Donner, Las Vegas, Nev. 89107.

OCT. 9-10—GALEVILLE, N.Y. (AA) Sky-Scrapers International FF Challenge. Site: AA Field. W. Dunwoody CD, 985 Ft. Salonga Rd., Northport, N.Y. 11768. Sponsor: Sky-Scrapers.

OCT. 9-10—SUFFIELD, CONN. (AA) NCRCC RC Pattern & Scale Meet. Site: NCRCC Field. S. Griswold CD, Highland Ave., New Hartford, Conn. 06057. Sponsor: Northern Connecticut Radio Control Club.

OCT. 9-10—NEW ORLEANS, LA. (AA) 10th Annual Crescent City RC Meet. Site: Club Field. A. Wiltz CD, 3231 47th St., Metairie, La. 70001.

OCT. 10—ROCKFORD, ILL. (AA) F.V.M.A.A. Super "AA" CL Bash. Site: Riverdahl Park. B. Vojslavek CD, 7819 Chestnut Ave., Woodbridge, Ill. 60515.

OCT. 10—READINGTON, N.J. "Antique Antics" RC Antique Meet. Site: Solberg Airport. C. Gill CD, 835 Gilbride Rd., Martinsville, N.J. 08836.

OCT. 16—PHOENIX, ARIZ. (AAA) Arizona State FF & RC Championships. Site: Phoenix. W. Roseberry CD, 4922 W. LaMar Rd., Glendale, Ariz. 85301.

OCT. 17—EAST MEADOW, N.Y. (AA) L.I.A.M.A.C. Outdoor FF & CL Championships. Site: Mitchell Field. J. Pallet CD, 30 Emerson Rd., Brookville, Glen Head, N.Y. 11545.

OCT. 24—SUFFIELD, CONN. (A) 3rd Annual RC Snow Gaggle. Site: NCRCC Field. H. Wainauski CD, 38 Alder Rd., Simsbury, Conn. 06070. Sponsor: Northern Connecticut Radio Control Club.

OCT. 30-31—OKLAHOMA CITY, OKLA. Oklahoma Model Hobbie Fair Meet. Site: State Fair Park. R. McGee CD, 508 W. Eubanks, Oklahoma City, Okla. 73118. Sponsor: T.O.R.K.S.

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